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Applying Customer Lifetime Value to Major League Baseball Season Tickets

John T. Drea

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Abstract

Customer lifetime value (CLV) is a commonly used metric for assessing marketing performance among businesses; however, there is little evidence of the use of CLV in Major League Baseball (MLB). The authors provide a methodology for calculating CLV for season ticket buyers to properly account for all direct revenue streams for a fan attending an MLB game, including ticket, concession, parking, and auxiliary revenues. Applications for customer lifetime value for MLB teams includes measuring the effectiveness of marketing activities, identifying seating that is over/under priced, and assisting in the management of fan experiences.

Keywords: *Customer lifetime value, major league baseball, metrics, sports marketing, season tickets*

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Background

One of the most common metrics used in marketing is customer lifetime value (CLV), which is defined as the total revenues minus total variable costs (i.e., contribution margin dollars) derived over the lifetime of a customer. While CLV has been used as a marketing metric since the 1980s (Shaw & Stone, 1988), there is relatively little written on the calculation and implementation of CLV to Major League Baseball (MLB) teams for season ticket sales. The present research proposes a methodology for the calculation and implementation of CLV as a marketing metric for season tickets for MLB teams, including the identification of inputs and how CLV data can be used by MLB teams to improve season ticket sales and operations.

A formula for the measurement of CLV is provided by Gupta and Lehman (2003):

$$CLV = \$M \left(\frac{1}{1 - r + i - g} \right)$$

where \$M = margin dollars per customer, r = annual retention rate, i = rate of discount, g = annual growth in revenues (assumes that retention rates and margins are constant over time.)

To understand how CLV is calculated and applied, assume a customer buys a cup of coffee and a muffin at a local coffee shop three days per week, every week for a year. The coffee/muffin combination has a price of \$4 and a variable cost of \$1.50, the customer is expected to increase her/his order size by 5% per year, net present value is 3%, and that 70% of the coffee shop's customers are retained each year. The result is a CLV of \$1,392.86. If the same customer increased her/his coffee shop patronage from three to five days per week, the CLV would increase to \$2,321.43.

Applications of CLV

Organizations apply CLV as a marketing metric to achieve several purposes.

1. **Customer lifetime value (CLV) makes marketing more accountable.** By tracking CLV over time, it is possible to monitor CLV levels for changes that match changes in the marketing mix. Less direct metrics such as customer attitudes, beliefs, retention, and purchase intentions do not translate into a return on marketing investment (Gupta et al., 2006).
2. **The higher the CLV, the more important the customer, and the more the customer should expect from the organization.** Buyers who provide greater value to the organization are likely to expect more from the organization (Shah, 2016).

3. **CLV facilitates the analysis and measurement of the effectiveness of marketing activities by type of customer.** All customers are not created equal, and some customers cost more to service than the revenues they generate. CLV allows for the segmentation of customers into homogenous groups and provides a basis for analysis. Changes in CLV can be used to measure the effect of marketing activities on purchase behavior (Lenskold, 2002).
4. **CLV can be used to measure the economic value of a business.** When a business is analyzed for the purpose of determining its value during a potential acquisition, one of the inputs that can be used is the CLV of the customer base. This approach treats customers as assets that can increase or decrease in value over time, with CLV as a means of tracking the value of the asset over time (Irwin, Sutton, & McCarthy, 2008).

It is worth noting that while the CLV formula includes the direct margin dollars associated with a customer over his/her lifetime, the formula does not include the indirect effects of increased or lowered CLV on other products and services. In a study of online banking (Hogan, Lemon, & Libai, 2003), it was found that when a company loses a customer, it not only loses the direct stream of CLV for that customer, but also suffers an indirect effect from the word-of-mouth effect from the lost customer. Hogan et al. (2003) estimated the direct effect of losing a customer in the online banking industry was \$208, compared to an indirect effect of more than \$850.

Calculating Customer Lifetime Value for Major League Baseball Season Tickets

The market for MLB season ticket sales differs substantially from the market for season ticket sales in other major professional sports. NBA teams averaged 93.7% of arena capacity for the 2015–16 season. Twenty-three of 30 NHL teams averaged 95% or more of arena capacity for 2015–16 (ESPN, 2016a), and NFL teams routinely sell out stadium capacity. By comparison, MLB teams averaged 70.5% of stadium capacity in 2016 (Ballparks of Baseball, 2017; ESPN 2016). As professional sports teams near 100% arena/stadium capacity, there is less motivation for the team to monitor CLV, since there is typically a waiting list of individuals seeking to become season ticket holders. As a result, CLV is particularly relevant for MLB teams.

In many respects, season ticket sales for MLB teams provide an ideal setting for the application of CLV. MLB season ticket buyers are identifiable and can be tracked from year to year. Season ticket transactions typically occur only once per year for each customer. Ticket prices and variable costs are also relatively consistent within a ticket plan, which facilitates the aggregation of data in the calculation of CLV. Despite these advantages, MLB team season ticket sales provide some

unique challenges for the calculation and use of CLV as a metric. These challenges include multiple revenue streams from season ticket buyers (some of which are difficult to track), as well difficulties for calculating retention and in projecting growth.

Each MLB team has an 81-home game schedule. MLB teams typically offer a variety of season tickets and ticket packages, including full season packages (81 games); half-season packages (40-41 games), 20-, 10-, and 5-game ticket packages; weekend-only packages; bobble head day packages; etc. Each ticket package is available at multiple prices, depending on the section in which the seat is located. As a result, CLV calculations should be derived for each season ticket package (number of games) and section (location within the stadium). If a team has 10 different season ticket packages (81 games, 41 games, etc.) and 15 different sections (e.g., bleachers, field boxes, outfield boxes, etc.), there is a need to calculate and track 150 CLV values.

To calculate CLV on a per-section basis, the first step is to determine the average contribution margin for season ticket holder for each season ticket package in each section of the stadium. This is necessary because of the broad range of potential margin dollars generated from different types of ticket packages and seat locations. As an example, an 81-game “Field MVP” season ticket for the 2016 New York Yankees was priced up to \$16,200, while a 41-game half-season ticket at the grandstand level was priced at \$820 (New York Yankees, 2016). Calculating a CLV mean based on such a wide range of prices would not be as managerially relevant as CLVs based on section and ticket plan.

In addition to ticket revenue, MLB season tickets generate three additional categories of revenues that contribute to a direct contribution margin: parking, concession, and auxiliary revenues. Parking and concession (including merchandise) functions are often contracted to vendors in these areas who deliver these services and provide a portion of the revenues back to the team. Auxiliary revenues are an emerging area for many teams. As an example, the St. Louis Cardinals are the primary developers of “Ballpark Village,” a seven-city-block development contiguous to Busch Stadium that includes rooftop seating on game days, and a restaurant, museum, nightclub, and shops that are open year round. The initial \$100 million development is the first step of a \$750 million project that includes residential and hotel space and additional commercial development (Ballpark Village, 2016). The goal of such developments is to allow an MLB team such as the St. Louis Cardinals to capture additional revenues from fans both during and after each home game, and on non-game days as well when fans want to immerse themselves in their team and its subculture.

Contribution margin (\$M) for MLB season ticket packages can be calculated using the four categories of direct revenue sources emanating from a season ticket transaction: ticket revenue, parking revenue, concession revenue, and (potentially) auxiliary revenue.

$$\begin{aligned}
\$M_{t,i} = & \sum_{t=1}^a \sum_{i=1}^b (ATR_{t,i} - (C_t * ATR_{t,i}) \\
& + Show_{t,i} (Park_{t,i} + (ConcRev_i * Margin\% * N_t) \\
& + (AvgAuxMargin\$_{t,i} * N_t))
\end{aligned}$$

Where there are a levels of season ticket packages (t) and b different seating sections (i), and where:

- $\$M_{t,i}$ = average contribution margin dollars for season ticket package t in section i , where a section refers to all contiguous seats that are sold at the same price.
- $ATR_{t,i}$ = average ticket revenue for season ticket package t in Section i
- C_t = the average commission rate paid for a sale/renewal of season ticket package t
- $Show_{t,i}$ = the percentage of season tickets that actually pass through the turnstile in season ticket package t in section i
- $Park_{t,i}$ = Average net parking revenue for season ticket package t in Section i
- $ConcRev_i$ = Average concession revenues per game for level i
- $Margin$ = Average concession margin %
- N_t = number of games in the season ticket package
- $AvgAuxMargin\$_{t,i}$ = average auxiliary margin dollars generated from non-stadium activities for season ticket package t in Section i

This assumes that the margin on concessions to be constant regardless of the mix of concessions sold. The mix of concessions is likely to vary according to the demographics of the patrons in attendance (ex: the ratio of soft drinks to beer), but the model assumes the margin on these different concessions is constant. $Show_{t,i}$ is applied to revenues for parking, concessions, and auxiliary areas, since there is a gap between the attendance (tickets sold) and the turnstile count (individuals who actually entered the stadium).

It is important to capture all direct costs in the calculation of the margin dollars for determining CLV. As shown in Table 1, a hypothetical CLV calculated on average ticket revenue only (minus commission) is 34.9% lower for a customer buying an 81-game season ticket with an ATR of \$20/game. While the additional CLV provided by non-ticket direct revenues is typically greater (in dollars) for more expensive ticket packages, the percentage increase in CLV is smaller (23% in the hypothetical example.)

Table 1

*A Hypothetical Comparison of Customer Lifetime Values (CLVs)
for Tickets Only vs. All Direct Revenues***

	\$20 Average Ticket Revenue Assumes retention =.65, Concession revenue = \$10, Parking revenue = \$10, Auxiliary revenue = \$10, Show % = 88%		\$30 Average Ticket Revenue Assumes retention =.7, Concession revenue = \$12, Parking revenue = \$11, Auxiliary revenue = \$12, Show % = 90%		\$50 Average Ticket Revenue Assumes retention =.75, Concession revenue = \$16, Parking revenue = \$12, Auxiliary revenue = \$20, Show % = 85%	
	Ticket Revenue Only	All Direct Revenues	Ticket Revenue Only	All Direct Revenues	Ticket Revenue Only	All Direct Revenues
81-Game package	\$4,029.23	\$6,185.91	\$8,127.93	\$11,747.79	\$16,368.75	\$21,245.63
41-Game Package	\$2,039.49	\$3,131.13	\$4,114.14	\$5,946.41	\$8,285.42	\$10,753.96
20-Game Package	\$994.87	\$1,527.38	\$2,006.90	\$2,900.69	\$4,041.67	\$5,245.83
10-Game Package	\$497.43	\$607.84	\$1,003.45	\$1,450.34	\$2,020.83	\$2,622.92
**For all average ticket revenue levels, the margin on concessions is set at 50%, the commission on ticket sales is 3%, and the margin on auxiliary revenues is 30%						

Aggregating Customers for CLV

Customers should be aggregated as a basis for calculating customer lifetime value in at least two different ways. First, as previously discussed, CLV can be determined on the type of the season ticket package. In this approach, season ticket package buyers in the same general seating area can be aggregated to determine an average CLV for the ticket package/seating area. This is particularly appropriate for MLB season ticket packages, since the types of ticket package purchased yields substantially different margin dollars, which in turn yields significantly different CLVs. As shown in Table 1, CLVs can range from less than \$500 to well over \$10,000 (and even higher for buyers of luxury boxes and premium seating.)

Second, an organization should also aggregate its existing customer base according to customer characteristics. This would utilize the concept of the family life cycle and/or cluster segmentation to determine CLV for different customer clusters (the 28-year-old single individual with no dependents vs. the 65-year-old married retiree). Data collected in this format would be useful for determining who an organization should target—is a 65-year-old with high discretionary income a better choice than a 28-year-old with less discretionary income but a potentially longer purchase period?

The rationale for calculating and tracking CLV according to both the type of ticket package purchased and the type of customer is that each method of aggrega-

tion produces a CLV to measure different aspects of marketing operations. While both methods of aggregation create a basis for tracking customer value over time, each method of aggregation yields specific metrics that are managerially useful. Aggregating customers according to the ticket package/seat location facilitates the identification of over/underpriced seating areas, while aggregating customers according to customer characteristics can be used to more effectively manage incentives and fan experiences.

Identification of Over-/Underpriced Seating

The calculation of CLV and specifically retention (r) in MLB team season tickets can identify sections of the stadium that may be over-/underpriced relative to other sections. Seating sections that have low retention percentages provide a signal from buyers that the benefits from tickets in that section do not meet/exceed the ticket price. In sections where r is more than one standard deviation lower than the mean retention for the stadium, it is likely that the section is overpriced. Retention is defined here as retaining the customer in any season ticket package, so a lower retention percentage for a particular section would indicate that buyers are no longer customers (i.e., not just switching to another section of the stadium or a different ticket package that is perceived to be a better value).

For example: Assume two sections of seating are adjacent, with the section closer to home plate priced at \$35/ticket and an adjacent section priced at \$28/ticket. CLV can be used to identify whether one of the two sections of seats are inappropriately priced; that is, the \$35 price may be too high (which would result in a lower retention and potentially lower CLV for the \$35 ticket which is seen by the buyer as a comparatively lesser value) or the \$28 price may be too low (which would result in a higher retention rate and higher CLV for the \$28 ticket). To determine whether the \$28 ticket is underpriced or if the \$35 ticket is overpriced, it is necessary to examine the retention rate for each section and compare it with the overall retention rate for the stadium. If the \$28 ticket is located in a section with a retention rate of 70% and the \$35 ticket is in a section with a 55% retention rate, the issue would hinge upon the overall park retention rate; if overall retention is 70%, the \$35 seat is overpriced, while if the overall retention rate is 58%, the \$28 seat is underpriced.

Managing Fan Experiences

Most MLB teams provide different levels of incentives to season ticket buyers, depending upon the ticket package selected. For example, the Detroit Tigers provide buyers of more expensive ticket packages with additional incentives including parking next to the stadium, personalized name plates on seats, and private batting practice sessions (Detroit Tigers, 2016), and the Baltimore Orioles provide a special entry gate for season ticket holders and free tickets to selected spring training games (Baltimore Orioles, 2016).

Incentives that add value to season tickets can increase season ticket holder retention, encourage existing season ticket holders to upgrade to higher priced packages, or attract new season ticket holders. The cost of annual incentives can be subtracted from the annual margin dollars generated to allow a season ticket operation to determine whether providing certain incentives results in higher CLV. Teams can consider applying specific incentives to sections of seating with low CLV and low retention in order to increase perceptions of value for seats in a low CLV/r section.

One of the primary influences on retention is the perceived value of the aggregate experience of attending the games in an MLB season ticket package. While there is research examining the relationship between attendance and variables such as winning, weather, promotions (Drea, 1991) and payroll (Lependorf, 2012), there is less available research on a more basic but subjective construct; did the fan enjoy himself/herself? Seeing the home team win generally makes an experience more enjoyable, but so does a comfortable seat, good friends, and a fun atmosphere. One of the ways of enhancing retention (which in turn, increases CLV) is to maximize the fan experience. Since not all fans are likely to be motivated by the same incentives, tailoring incentives to fan needs would be prudent. As an example, the Milwaukee Brewers allow season ticket holders to choose from a menu of benefits that include autographed prints, \$2 soft drink refills, and/or sliding down team mascot “Bernie Brewer’s” slide beyond the left field wall (Milwaukee Brewers, 2016). The use of a menu of benefits allows each season ticket buyer to self-select the incentives that provide the greatest degree of benefit to the buyer.

Challenges for Determining Customer Lifetime Value for MLB Season Ticket Holders

Calculation of Margin Dollars

Season ticket revenue is only one component of a total revenue stream from a season ticket buyer. Additional direct revenue streams for most teams include concession sales and parking sales, and some teams have additional revenue streams through adjacent entertainment developments (nightclubs, museums, etc.). The challenge arises in connecting these additional costs/revenues to season ticket packages. While margin dollars from parking can be directly tied to a customer’s season ticket package (if the teams sells a season ticket parking pass, which is common for teams that control parking revenues), concessions and auxiliary revenues typically are often not tied to individual season ticket holders. The simple though imprecise way to address this issue in calculating CLV is to include an average contribution margin for concessions, and apply that total to all season ticket packages (e.g., if the average concession spend is \$15/person and the profit margin is 50%, $M_{concessions} = \$7.50$ per person per game.)

The concern with this simplistic approach is that all customers do not spend the same amount on concessions, and there is believed to be a relationship between the concession spend per game and the price of a ticket; that is, customers who spend more per game on season tickets are also likely to spend more on concessions, compared to customers who buy inexpensive per game season ticket packages.

In order to increase the precision of CLV calculation, it is important to have an accurate estimation of all contribution margin sources. One method of estimating concessions by seating area is to start with the amount of concessions sold at each level of the stadium (field level, loge level, and terrace level). It would be a reasonable assumption that terrace concessions are likely sold primarily to individual terrace tickets, loge concessions are sold only to individuals with loge or terrace tickets, and field/street level concessions are sold to individuals from all three levels. By examining the percentage of tickets sold for each level of the stadium on different dates and the dollar value of concessions sold on each level when the percentage of attendance by level varies, it is possible to estimate what percentage of concessions from each level are sold to buyers from each level of the stadium.

Calculation of Retention

It is worth noting that the concept of retention is different for professional sports season ticket sales than for typical consumer products. Unlike most other consumer products where customers may switch from Folgers to Maxwell House or from Sears to JCPenney, consumers rarely switch teams. In professional sports, the retention goal is not to prevent customers from being lured away to other teams but to keep customers engaged with a high degree of identification with the team (McDonald and Stavros, 2007).

Most MLB teams offer myriad options for season ticket packages, ranging from as few as five games up to a full 81-game home season, and with prices for individual seats ranging from \$10-12 per game to over \$200 per game. Season ticket buyers often move from one season ticket package to another, depending on a variety of factors including household life cycle pressure on discretionary income and strength of fan identification with the team. If a fan who purchased a \$20 ticket in a full season package (\$1,620 price) returns the following year and purchases a \$20 ticket in a ten game package (\$200 price), the customer would be considered to be “retained,” even though the value of the customer decreased. Because of this, the variables of retention and growth (see below) are inextricably linked for professional sports CLV calculations.

Calculation of Growth

One of the explicitly modeled variables in the CLV formula is growth (g). Growth is typically interpreted to represent an increase in what buyers are willing to spend each year; however, in the case of season tickets, season ticket buyers

often trade up and trade down both in terms of the number of games on a season ticket package, as well as the price of a seat (ex: from field/street level to terrace level, or vice versa). As a result, growth is the function of the cumulative effects of changes in ticket prices and the movement of ticket buyers between season ticket packages. This cumulative movement between season ticket packages (# of games x seat price) changes the revenue derived from a season ticket buyer from one year to another and can be reflected in the calculation of growth (g) in the CLV calculations.

Table 2 provides a hypothetical example of how growth can be calculated, using six retained season ticket holders.

Table 2

A Hypothetical Calculation of Growth (g) from Buyers Trading Up and Trading Down

Ticket buyer	Trading Up, Down, or Even	Year 1 Revenues	Year 2 Revenues	Growth (g)
A	Even	20 games x \$30/ticket = \$600	20 games x \$32/ticket = \$640	
B	Down	81 games x \$40/ticket = \$3240	41 games x \$44/ticket = \$1804	
C	Up	10 games x \$30/ticket = \$300	20 games x \$22/ticket = \$440	
D	Up	41 games x \$20/ticket = \$820	20 games x \$44/ticket = \$880	
E	Even	81 games x \$30/ticket = \$2430	81 games x \$32/ticket = \$2592	
F	Up	20 games X \$45/ticket = \$900	41 games x \$48/ticket = \$1968	
		Year 1 average revenue per account = \$1,381.67	Year 2 average revenue per account = \$1,387.33	+0.41%

- Ticket buyers A and E kept the same package from year 1 to year 2, with only a \$2/ticket increase in the base price.
- Ticket buyer B traded down by reducing the number of games in the package from a full season to a half season package.
- Ticket buyer D also reduced the number of games, but purchased a more expensive per game seat.
- Ticket buyers C and F increased the number of games.

This type of movement is likely to be more common when the supply of available season tickets exceeds the demand and season ticket buyers are not concerned that trading down would prevent the buyer from acquiring a better/more expensive seat location in the future.

Lack of Control Over Key Variables

There is a well-recognized positive association between attendance and winning in professional sports. Examining 30 years of MLB attendance, Glass (2003) found a correlation of $r = 0.464$ between the variables of attendance and winning percentage. In addition, payroll has also been reported to be even more strongly

associated with attendance (Lependorf, 2012), though there is likely an interaction between payroll size and winning percentage. While MLB marketing departments are tasked with the responsibility of maintaining and increasing ticket revenue and CLV, payroll size and winning percentage are outside of their control. Lewis and Tripathi (2014) make a claim that marketing decisions impact revenues, retention, and costs, so the key inputs into the CLV model are functions of marketing. Since one of the main influences on retention is the perceived likelihood of a winning season, this makes roster construction a marketing variable. In practical terms, it is necessary to model attendance on a team by team basis, and then attempt to exceed projections through the use of marketing activities.

Inclusion of Customer Acquisition Costs

The inclusion of customer acquisition costs in calculating CLV makes sense from a conceptual standpoint, since the primary purpose of making a CLV calculation is to determine the net margin dollars generated over a customer's lifetime. In practice, however, this can be problematic (Bendle & Bagga, 2016). For example, assume a team targets the top four deciles of potential new season ticket buyers from a database, with those four deciles totaling 5,000 potential customers at a cost of \$20/customer for a total cost of \$100,000. If 250 new customers are attracted from the first two deciles and none are attracted from the second two deciles, the customer acquisition cost is $\$100,000/250 = \400 per customer. If the team had been more precise and targeted only the top two deciles (2,500 potential customers), spent \$50,000 and yielded the same 250 new customers, the customer acquisition costs would have been \$200 per customer. As a result, including acquisition costs into CLV calculations means that the efficiency of targeting decisions has a direct impact on CLV at the individual customer level. Including acquisition costs also distorts the value of a company's season ticket holders for the same reason.

Recommendations/Conclusions

While customer lifetime value (CLV) has become a common metric used in most industries, there is little evidence of its application to Major League Baseball season ticket sales. Calculating CLV solely on ticket price provides an incomplete metric for evaluating the effectiveness of marketing activities, making it necessary to model all direct sources of contribution margin dollars (including parking, concessions, and auxiliary revenues).

It is recommended that MLB teams consider calculating and using CLV as a routine element of the evaluation of marketing activities, and that teams should fully model all team-controlled revenue sources (ticket revenue, concession revenue, parking revenue, and auxiliary revenues, as appropriate) as a part of the determination of the contribution margin variable of CLV.

Teams interested in adding CLV as a useful metric would be advised to consider the following recommendations.

- Identify and model concession revenues for different seating areas, avoiding the assumption that all customers generate the same amount of concession revenue. While most teams are unable directly connect a seat holder to his/her concession purchases, it is possible to estimate concession sales by level in the arena/stadium using data covering an entire season.
- Use CLV to evaluate the effectiveness of marketing activities and to identify sections where tickets are overpriced and underpriced by calculating CLV for each season ticket package/seating area combination, and also by type of customer.
- Consider the use of ticket package incentives to create additional value for customers.

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