Demand, Consumer Surplus and Pricing Inefficiency in the NFL: A Case Study of the Secondary Ticketing Market using StubHub

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An examination of the prevalence of ticket scalpers outside sporting events and the proliferation of Web-based ticket resellers makes it readily apparent that sport organizations frequently under-price tickets to sporting events. This pricing inefficiency can result in the loss of thousands, if not millions, of dollars of ticket revenue that could have been realized by the sport organization and is instead captured by the secondary ticket market. A recent 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: After figuring out digital media, dealing with secondary ticketing is our most critical issue, and the biggest issue facing teams in all sports. 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. (SportsBusiness Journal, p. 20) Sal Galatioto, Founder and Chairman of Galatioto Sports Partners, responded similarly: We've done work with both the Jets and Giants, and you'd be amazed how many of those longtime ticket-holders go to a few games and then sell their other games for an enormous profit. 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. (SportsBusiness Journal, p. 20) Literature available on the setting of ticket prices in sport is extremely limited, and has focused on factors used to determine ticket prices in the primary market (Reese & Mittelstaedt, 2001; Rishe & Mondello, 2003; Rishe & Mondello, 2004).

Reese and Mittelstaedt (2001), in an analysis of NFL primary ticket prices, found that factors including team success, organization revenue needs, public relations, and market toleration were used by individual teams in establishing price. In a study examining ticket price determination in multiple professional sports leagues, Rishe and Mondello (2004) found previous year's team performance, income, moving into a new stadium, and population to be the most important factors impacting primary market price. In their previous work, however, the authors noted that price determination factors inevitably vary from team-to-team based on unique situational factors (Rishe & Mondello, 2004).

No published research specifically examining secondary market price determination could be identified. However, recognizing the existence of game-to-game demand fluctuations, Rascher, McEvoy, Nagel, and Brown (2007) showed that in fact millions of dollars are left on the table by teams not changing their prices from game to game. Variable ticket pricing is one way to partially share in the scalping market's profits. However, it is not completely efficient as prices are set prior to the season before the full extent of demand is known. A number of studies have been conducted on the related subject of demand for sporting events. Previous studies have examined the variables that influence demand for professional sport tickets such as home field advantage (Boyd & Boyd, 1998), outcome uncertainty (Falter & Perignon, 2000; Forrest & Simmons, 2002), and labor strikes (Matheson, 2006). These studies all created a model for demand using attendance as the dependant variable and a variety of independent variables. For example, Boyd and Boyd claimed that attendance was a function of ticket prices, home team winning percentage (current and previous season), population, average household income, and a measure of other recreational opportunities in the local area. However, in the NFL, where over 96% of tickets are sold ("Turnstile Tracker," 2008), there is little variation in attendance figures making demand estimates using this method less significant. Further, since ticket prices are fixed and set long before the season starts, they are not truly a reflection of the demand conditions for each individual game. Using data from the secondary market, where ticket prices and availability fluctuate, this study hopes to gain a greater understanding of the variables that affect demand in this highly-popular professional league.

This study attempts to address this gap in the literature through an analysis of secondary market price and demand in the National Football League. Game-by-game data for all 32 teams from the 2007 season was obtained from StubHub, the largest secondary ticket market source. Unlike studies of demand that use the listed price on the ticket, which is determined prior to the season, the secondary market is a fluid market that has both demand and supply in contemporaneous time. The result is the classic simultaneity problem in sports. In order to resolve this, we use two-stage least squares (2SLS) with the first stage creating a forecasted supply of secondary market tickets and the second stage incorporating that forecasted quantity into the regression of transaction price. The transaction price model has an R^2 of 0.50. Signs of the coefficients on point spread, percent of capacity sold, new stadium, home and visiting team winning percentage, and listed ticket price are as expected. The forecasted

quantity of tickets sold in the secondary market is not statistically significant in the model. This is not surprising given that in the OLS model that does not account for simultaneity, it was statistically significant; however, it was biased due to the simultaneity. Further steps were taken to measure consumer surplus, pricing inefficiency by NFL teams, and excess demand for each game, and more extensive results will be presented.