

## Derived Demand in Professional Sports: Television Broadcast Ratings and the National Football League

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**Economics  
Abstract 2009-147**

**May 30, 2009  
11:00 AM**

**25 minute oral  
(Richland A)**

Introduction: Researchers of sport have devoted considerable attention to the subject of consumer demand. According to a recent article, no less than 60 studies have set out to identify determinants of demand in professional team sports (Borland & Macdonald, 2003). Despite the widespread acknowledgement for the topic's importance, fundamental questions remain unexamined. Notable is the enduring use of attendance as a proxy for demand in the analyses. While it is an entirely appropriate use of the attendance data, there is a need to elaborate on previous findings through the analysis of demand for sports programming, as media are the second greatest source of revenue in major league sports (Fort, 2006). Few studies have employed broadcast ratings at all much less to measure consumer demand, leaving open the question of how previous findings with respect to attendance correspond to other revenue streams. Furthermore, as most of these five dozen plus studies focus on either Major League Baseball (MLB) or European Football (soccer), a common refrain in the articles' discussion is caution in extrapolating their findings to other sports and leagues. The focus on MLB means that little has been learned about the largest of the North American sports leagues, the National Football League (NFL). This is understandable as nearly all of the stadiums are filled to capacity each weekend, making even censored attendance estimates highly speculative. Consequently, broadcast ratings are a logical choice to assess demand for NFL games.

Purpose: This article uses television ratings for NFL contests to estimate demand. Applying many of the same techniques and variables used in studies employing attendance data, this research poses two questions: 1) Do determinants of demand in the NFL match those of other major sports leagues? 2) Do determinants of demand for television broadcasts match those of attendance? Methods: Data on NFL games for the 2006 and 2007 seasons were collected from nfl.com and espn.com. Franchise tenure (in its current market), winning percentage entering the game, winning percentage the previous season, time of the contest, and indicator variables for whether the contest pitted two divisional opponents and whether the home team shared its market were recorded for each game. Market characteristics, specifically mean income and Metropolitan Statistical Area (MSA) population, were also recorded from the US Census Bureau (US Census, n.d.). Finally, television ratings for each contest were obtained from the Nielsen Company.

Regression analysis was conducted to determine which factors contributed to viewership. Demand was estimated using the equation:  $\ln(\text{homeRating}) = \beta_0 + \beta_1(\text{homeFranchiseTenure}) + \beta_2(\text{awayFranchiseTenure}) + \beta_3(\text{division}) + \beta_4(\text{lagHomeWinPct}) + \beta_5(\text{lagAwayWinPct}) + \beta_6(\text{homeWinPct}) + \beta_7(\text{winPctDifference}) + \beta_8(\text{homeShareMSA}) + \beta_9(\text{primetime}) + \beta_{10}(\ln(\text{homeIncome})) + \beta_{11}(\ln(\text{homePopulation})) + \epsilon$

where the independent variables are as described above and homeRating is the percentage of televisions in the home market tuned in at any given moment.

Results: Results show that the model predicted 71.2% of the variation in demand with nine of the eleven explanatory variables significant at the .05 level and six at .01. Those not found to be significant were division and winPctDifference, upholding recent findings in the uncertainty of outcome literature on the relative inconsequentiality of opponent and uncertainty after taking into account team quality (Lee & Fort, forthcoming; Szymanski, 2003; Tainsky & Winfree, working paper). By contrast, teams with longer tenures in the region, improved team quality, games held during primetime hours, and fan base income were all positively associated with television broadcast ratings, while population was a negative predictor.

Discussion: The results show that many of the same team quality and game uncertainty variables that influence attendance in other sports also impact demand for NFL telecasts. This symmetry further suggests that the framework for understanding gate demand can be extended to other revenue sources. This is especially important to the NFL, whose primary source of revenue is its television broadcast rights (Cave & Crandall, 2001). Of this study's specific findings, interestingly, fan base income is a positive predictor of television demand despite the fact that viewing costs are negligible. As previous studies have found individuals of lower socioeconomic status engage in homebound and sedentary activities (Kaplan, 1975; Robinson and Godbey, 1997; Stodolska and Alexandris, 2004), further research is warranted in this area.