



Sports Economics, Management and Policy  
Series Editor: Dennis Coates

R. Todd Jewell *Editor*

# Violence and Aggression in Sporting Contests

Economics, History and Policy

 Springer

# Sports Economics, Management and Policy

**Series Editor**

Dennis Coates

For further volumes:

<http://www.springer.com/series/8343>



R. Todd Jewell

Editor

# Violence and Aggression in Sporting Contests

Economics, History and Policy

 Springer

*Editor*

R. Todd Jewell  
Department of Economics  
University of North Texas  
Union Circle 1155  
Denton, TX 76203-5017, USA  
tjewell@unt.edu

ISSN 2191-298X                      e-ISSN 2191-2998  
ISBN 978-1-4419-6629-2            e-ISBN 978-1-4419-6630-8  
DOI 10.1007/978-1-4419-6630-8  
Springer New York Dordrecht Heidelberg London

Library of Congress Control Number: 2011934247

© Springer Science+Business Media, LLC 2011

All rights reserved. This work may not be translated or copied in whole or in part without the written permission of the publisher (Springer Science+Business Media, LLC, 233 Spring Street, New York, NY 10013, USA), except for brief excerpts in connection with reviews or scholarly analysis. Use in connection with any form of information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed is forbidden.

The use in this publication of trade names, trademarks, service marks, and similar terms, even if they are not identified as such, is not to be taken as an expression of opinion as to whether or not they are subject to proprietary rights.

Printed on acid-free paper

Springer is part of Springer Science+Business Media ([www.springer.com](http://www.springer.com))

# Contents

## Part I Introduction

- 1 **Violence and Aggression in Spectator Sports: A Prologue** ..... 3  
R. Todd Jewell
- 2 **A Brief History of Violence and Aggression in Spectator Sports** ..... 11  
R. Todd Jewell, Afsheen Moti, and Dennis Coates

## Part II North American Team Sports

- 3 **Incentive for Aggression in American Football**..... 29  
Janice A. Hauge
- 4 **Does Violence in Professional Ice Hockey Pay? Cross Country  
Evidence from Three Leagues** ..... 47  
Dennis Coates, Marcel Battré, and Christian Deutscher
- 5 **Crime and Punishment in the National Basketball Association**..... 65  
David J. Berri and Ryan M. Rodenberg

## Part III North American Individual Sports

- 6 **The Demand for Aggressive Behavior in American Stock  
Car Racing** ..... 79  
Peter von Allmen and John Solow
- 7 **Aggression in Mixed Martial Arts: An Analysis of the  
Likelihood of Winning a Decision**..... 97  
Trevor Collier, Andrew L. Johnson, and John Ruggiero

**Part IV International Team Sports**

**8 Aggressive Play and Demand for English Premier League Football** ..... 113  
R. Todd Jewell

**9 Violence in the Australian Football League: Good or Bad?** ..... 133  
Ross Booth and Robert Brooks

**Part V Spectator Violence and Criminal Activity**

**10 The Effect of Hooliganism on Greek Football Demand** ..... 155  
Vassiliki Avgerinou and Stefanos G. Giakoumatos

**11 Sport Events and Criminal Activity: A Spatial Analysis** ..... 175  
Stephen B. Billings and Craig A. Depken II

**About the Contributors** ..... 189

**Index** ..... 193

# List of Figures

<b>Fig. 3.1</b>	Average percent of capacity by degree of penalty, 2006–2009 .....	33
<b>Fig. 3.2</b>	Average yards per penalty of top ten penalized teams, 1995–2009 .....	35
<b>Fig. 3.3</b>	Average number of offensive penalties per year, 1995–2009.....	36
<b>Fig. 3.4</b>	Average number of offensive penalties per year by winning percentage, 1995–2009.....	37
<b>Fig. 3.5</b>	Average number of penalties per year for playoff teams versus all others, 1995–2009 .....	37
<b>Fig. 9.1</b>	Players charged, 2000–2009.....	140
<b>Fig. 9.2</b>	Players suspended, 2000–2009.....	140
<b>Fig. 9.3</b>	Players fined, 2000–2009 .....	141
<b>Fig. 9.4</b>	Attendance and membership, 2000–2009 .....	142
<b>Fig. 10.1</b>	Incidents Type 1 to Type 3 .....	162
<b>Fig. 10.2</b>	Incidents Type 4 to Type 10 .....	164
<b>Fig. 10.3</b>	Violence in Greek Stadia .....	165
<b>Fig. 10.4</b>	Incidents per cluster.....	166
<b>Fig. 11.1</b>	The two venues in city center of Charlotte, NC .....	180
<b>Fig. 11.2</b>	Kernel density estimator depicting distribution of total crime in Charlotte, NC from January 1, 2005 through December 31, 2008 .....	181
<b>Fig. 11.3</b>	Kernel density estimator depicting distribution of difference in total reported crime in Charlotte, NC on event days and nonevent days from January 1, 2005 through December 31, 2008.....	182





# List of Tables

<b>Table 3.1</b>	Safety and aggression-related penalties in the NFL, 2010 .....	32
<b>Table 3.2</b>	Highest penalty differential by team and season, 1995–2009 .....	38
<b>Table 3.3</b>	Summary statistics, 1995–2009 .....	40
<b>Table 3.4</b>	QMLE model results .....	40
<b>Table 3.5</b>	Probit regression results .....	41
<b>Table 3.6</b>	FGLS results.....	42
<b>Table 4.1</b>	NHL descriptive statistics .....	53
<b>Table 4.2</b>	Descriptive statistics for Germany .....	54
<b>Table 4.3</b>	Descriptive statistics for Finland.....	54
<b>Table 4.4</b>	Points regression .....	56
<b>Table 4.5</b>	Goals against regression.....	56
<b>Table 4.6</b>	Points regression with penalty types .....	57
<b>Table 4.7</b>	Log attendance regression.....	58
<b>Table 4.8</b>	Log attendance regression with lagged variables.....	59
<b>Table 4.9</b>	Log attendance regression with penalty types .....	60
<b>Table 4.10</b>	Log real revenue regression in the NHL .....	61
<b>Table 5.1</b>	A sample of the most productive players in NBA history .....	71
<b>Table 5.2</b>	Two views of Shaquille O’Neal .....	71
<b>Table 5.3</b>	Value of Shaquille O’Neal hitting free throws at an average rate.....	72
<b>Table 6.1</b>	Overview of NASCAR accident data 2001–2009.....	82
<b>Table 6.2</b>	Summary statistics .....	89
<b>Table 6.3</b>	Regression results using CRASHES .....	90
<b>Table 7.1</b>	Descriptive statistics.....	101
<b>Table 7.2</b>	Mean differences in explanatory variables.....	103
<b>Table 7.3</b>	Probit results.....	105
<b>Table 7.4</b>	Marginal effects.....	107
<b>Table 8.1</b>	Aggressive play: 2,660 English Premier League matches (complete sample: 2003–2004 to 2009–2010).....	116

<b>Table 8.2</b>	Aggressive play by league position: 2,660 English Premier League matches (complete sample: 2003–2004 to 2009–2010) .....	117
<b>Table 8.3</b>	Summary statistics: 1,957 English Premier League matches (estimation sample: 2004–2005 to 2009–2010) .....	119
<b>Table 8.4</b>	English Premier League attendance demand: dependent variable = <i>attendance (per match)</i> , violent play = <i>disciplinary points (1-year lag)</i> , $N = 1,957$ matches.....	123
<b>Table 8.5</b>	English Premier League attendance demand: dependent variable = <i>attendance (per match)</i> , violent play = fouls and cards, $N = 1,957$ matches .....	124
<b>Table 8.6</b>	English Premier League attendance demand: dependent variable = <i>attendance (per match)</i> , violent play = fouls and card types, $N = 1,957$ matches.....	126
<b>Table 8.7</b>	Elasticity of demand for aggressive play (from estimates in Table 8.4): ranked by average league points .....	128
<b>Table 8.8</b>	Elasticity of demand for aggressive play (from estimates in Table 8.6): ranked by average league points .....	129
<b>Table 9.1</b>	Comparison of tribunal outcomes: before and after the introduction of the match review panel system.....	139
<b>Table 9.2</b>	Comparison of attendance and membership data: before and after the introduction of the match review panel system.....	142
<b>Table 9.3</b>	Home game attendance: base model specification.....	143
<b>Table 9.4</b>	Home game attendance: fixed effects specification .....	144
<b>Table 9.5</b>	Home game attendance: fixed effects specification with finals interaction.....	145
<b>Table 9.6</b>	Home game attendance: fixed effects specification with wins interaction .....	146
<b>Table 9.7</b>	Home game attendance: fixed effects specification with MRP interaction .....	147
<b>Table 10.1</b>	Football-related arrests and injuries .....	157
<b>Table 10.2</b>	Percentage of matches affected .....	161
<b>Table 10.6</b>	Summary statistics .....	170
<b>Table 10.7</b>	Greek Super League attendance demand .....	170
<b>Table 11.1</b>	Daily reported crimes in Charlotte, NC .....	183
<b>Table 11.2</b>	Frequency of event types in Charlotte, NC .....	183
<b>Table 11.3</b>	Negative binomial estimation results: dependent variable is daily number of reported crimes .....	184
<b>Table 11.4</b>	Negative binomial estimation results: dependent variable is daily number of reported crimes by distance band.....	185

# Contributors

**Vassiliki Avgerinou** University of Peloponnese, Sparta, Greece  
vasavg@uop.gr

**Marcel Battré** University of Paderborn, Paderborn, Germany  
marcel.battre@wiwi.upb.de

**David J. Berri** Southern Utah University, Cedar City, UT, USA  
berri@suu.edu

**Stephen B. Billings** University of North Carolina at Charlotte, Charlotte, NC, USA  
sbillin2@uncc.edu

**Ross Booth** Monash University, Melbourne, VIC, Australia  
ross.booth@buseco.monash.edu.au

**Robert Brooks** Monash University, Melbourne, VIC, Australia  
robert.brooks@monash.edu

**Dennis Coates** University of Maryland, Baltimore County, Baltimore, MD, USA  
coates@umbc.edu

**Trevor Collier** University of Dayton, Dayton, OH, USA  
collier@udayton.edu

**Craig A. Depken II** University of North Carolina at Charlotte,  
Charlotte, NC, USA  
cdepken@uncc.edu

**Christian Deutscher** University of Paderborn, Paderborn, Germany  
christian.deutscher@wiwi.upb.de

**Stefanos G. Giakoumatos** Technological Educational Institute of Kalamata,  
Kalamata, Greece  
giakoumatos@teikal.gr

**Janice A. Hauge** University of North Texas, Denton, TX, USA  
jhauge@unt.edu

**R. Todd Jewell** University of North Texas, Denton, TX, USA  
tjewell@unt.edu

**Andrew L. Johnson** Texas A&M University, College Station, TX, USA  
ajohnson@tamu.edu

**Afsheen Moti** University of North Texas, Denton, TX, USA  
afsheenmoti@gmail.com

**Ryan M. Rodenberg** Florida State University, Tallahassee, FL, USA  
rrodenberg@fsu.edu

**John Ruggiero** University of Dayton, Dayton, OH, USA  
ruggiero@notes.udayton.edu

**John Solow** University of Iowa, Iowa City, IA, USA  
solow@uiowa.edu

**Peter von Allmen** Skidmore College, Saratoga Springs, NY, USA  
pvonallm@skidmore.edu

**Part I**  
**Introduction**

# Chapter 1

## Violence and Aggression in Spectator Sports: A Prologue

R. Todd Jewell

### Background

As the title of this book suggests, the chapters it contains deal with the relationship between aggressive and violent play and spectator demand. This is not the first book to examine this issue, as the topic of violence in sports has been the subject of psychologists, sociologists, and other social scholars who are interested in explaining the behavioral motivations of players who engage in aggressive and violent play in contests or who are interested in understanding the behavior of consumers who watch these aggressive and violent games. For instance, sport psychologists are concerned with the individual traits that motivate violent behavior in sport, under the assumption that such violence can be mitigated with appropriate behavior-modification strategies (Abrams 2010).

The reader may well ask: “If an expansive literature already exists on the topic of violence in sport, why does this book exist?” Primarily, this book exists because the lens of economics has not been systematically applied to violence and aggression in sports, with the notable exception of ice hockey as shown in Chap. 4 of this book. Following this introductory chapter and a chapter devoted to the history of violence in spectator sports, this book contains seven chapters that empirically analyze aggression and violence in various worldwide sports leagues from an economic viewpoint. Highlighted in these seven chapters are the incentives, in terms of costs and benefits, that drive the behavior of athletes and teams within contests and the incentives that influence whether a league encourages, punishes, or outright bans aggressive and violent play. The costs and benefits of aggression and violence in sports imply that leagues, teams, and athletes must make tradeoffs when determining the appropriate level of aggression and/or violence in their league or sport. In addition, this book contains two chapters on violence outside of sporting contests

---

R.T. Jewell (✉)  
University of North Texas, Denton, TX, USA  
e-mail: tjewell@unt.edu

that influence the sports industry. These final two chapters concentrate on the impact that violence around sporting contests can have on the sports industry and the games themselves. All chapters include historical background and relevant policy-related implications of the empirical findings.

From the perspective of an economist, violence in sporting contests is an outcome of the forces of supply and demand, and violence and aggression exist because fans respond positively to them. Spectators may directly demand violence and aggression because these elements of sporting contests are entertaining. Teams and leagues that wish to maximize profits will optimally respond to spectator preferences by ratcheting up the aggression level. In addition, spectators are clearly entertained by seeing their favorite teams win, and there may be a relationship between aggressive play and team success. If violence and aggression help a team be successful, then fans will demand more violent or aggressive play to produce more wins.

The economic viewpoint also helps us to see other connections between violence, aggression, and the behavior of leagues, teams, and athletes. Thus, a secondary reason that this book exists is to stimulate further thought and research on violence and aggression in sports. Consider, for instance, the issue of injuries and head injuries specifically. Recently, information has come to light concerning the real impact of concussions on the health of athletes during their careers, the length of athletic careers, and the health of athletes after they retire. In recent months, high-profile athletes from a wide variety of sports have been sidelined with concussions: Aaron Rodgers, quarterback of the National Football League (NFL) champion Green Bay Packers, suffered two concussions during the 2010–2011 season (AP 2010); Sidney Crosby of the Pittsburgh Penguins of the National Hockey League (NHL) suffered a concussion in January 2011 that kept him out of a substantial part of the season (AP 2011a); professional skier Lindsey Vonn suffered a concussion in a training accident in February 2011 (AP 2011b); and Chris Paul of the National Basketball Association's New Orleans Hornets suffered a concussion in March 2011 (AP 2011d).

The cases of Sidney Crosby and Aaron Rodgers are especially relevant to the issues examined in this book. Among popular North American sports, ice hockey and gridiron football are possibly the most violent. Ice hockey is, arguably, not an intrinsically violent sport, but the NHL has a history of “the enforcer” whose main role is to physically intimate the opposition and protect his team from being intimidated. Further, evidence suggests that NHL fans get enjoyment from aggressive and violent play (see the literature review in Chap. 4 of this book). Crosby is one of the brightest young stars of the NHL, and losing him to injury of any kind will dilute the product, thus reducing the revenue-generating potential of games involving his team. The NHL clearly has an incentive to protect “assets” like Sidney Crosby, but the league also must respond to fan demand for aggressive play in order to maximize revenue. It is this sort of trade off to which economics is uniquely suited as an analytical tool. Furthermore, the NHL has recently seen some publicly aired backlash from an important sponsor regarding violence in the game. In a letter to the league, Air Canada asked the NHL to crack down on violence or risk losing them as a sponsor (Klein and Belson 2011). Clearly, violence and aggression can influence the NHL's bottom line in a positive as well as a negative manner.



Gridiron football, on the other hand, is clearly a violent sport, since aggressive hitting is fundamental to the game (see Chap. 3 of this book). Given the importance of the quarterback position in determining game outcomes, the concussions suffered by Aaron Rodgers could easily have ruined his team's chance to win the 2011 Super Bowl. That he was able to recover and lead his team to victory over the Pittsburgh Steelers only serves to illustrate the importance of regulating the inherent violence of gridiron football, especially as it relates to hits on the quarterback. Furthermore, the NFL has made headlines for an overall increase in injuries to current players, including head and brain injuries (Wendell 2011), and for health problems suffered by retired players, including Alzheimer's disease and dementia (AP 2009).

For the NFL, the issues of aggression, violence, and injury are now central to the relationship between players and management, as seen in negotiation for the most recent collective bargaining agreement (Pasquarelli 2010). As players get faster and stronger, and if the NFL is able to convince the players to extend the number of games in the regular season, injuries resulting from the violent nature of gridiron football will no doubt increase in the NFL. In a reaction to recent events and increased knowledge of the damaging effects of concussions, both the NHL and the NFL have chosen to change the way concussions are managed in game situations (AP 2011c, e). No doubt these decisions will affect all facets of the game, from the way management negotiates with players on salary and other issues, to the number of games that injured players miss, to the revenues generated by game-day attendance and TV viewership.

Finally, and lamentably, the recent deaths of NHL veteran Bob Probert and NFL veteran Dave Duerson clearly illustrate the personal cost paid by some professional athletes in violent sports. These tragic events also should sound a warning to the NHL and the NFL about the importance of dealing proactively with violence and injuries in their respective leagues, especially head injuries. A veteran of 16 NHL seasons playing for the Detroit Red Wings and the Chicago Blackhawks, Probert died in July 2010 of heart failure at age 45, but an examination of his brain tissue revealed a degenerative brain disease (chronic traumatic encephalopathy, CTE) also found in the brain tissue of almost two dozen deceased professional gridiron football players. Probert is the first ex-professional ice hockey player to have CTE confirmed after death. During his career, he was well known for his pugnacious style; he was even chosen by readers of *Hockey News* as ice hockey's best-ever enforcer (Schwarz 2011b). If Probert's life had not been shortened by a heart ailment, he almost certainly would have seen his quality of life diminished with symptoms similar to that of Parkinson's disease (Ziegler 2010).

Dave Duerson was an 11-year NFL veteran who played for the Chicago Bears, the New York Giants, and the Phoenix Cardinals. Duerson played one of the most violent positions in football, that of linebacker. If gridiron is a "collision sport," as the all-time great coach Vince Lombardi is credited with saying, then linebacker is the definitive "collision position." In February 2011, Duerson ended his own life at the age of 50 in a manner that would not damage his brain, which he asked to be donated to a long-term study on brain injuries (Schwarz 2011a). He had spent the past several

years working with the families of ex-NFL players who had dementia. A few months after his death, researchers at Boston University examined Duerson's brain tissue and found that he did indeed have CTE (Schwarz 2011c).

## Overview of the Book

This book is split into five sections. The prologue in the present chapter and a discussion of the history of violence in spectator sports comprise the introductory Part I. While the remaining chapters of this book deal with economic analysis of issues related to demand and success in sports and their relationship to violence and aggression, the discussion in Chap. 2 gives some historical background and evaluates the reasons why demand for violence in sports exists. The main thesis of Chap. 2 is that that violence and aggression have always been a part of spectator sports because fans derive pleasure from such behavior. To support their thesis, Todd Jewell, Afsheen Moti, and Dennis Coates give a brief overview of the history of violence and aggression in spectator sports, with special attention paid to bullfighting in modern-day Spain.

Parts II through IV of this book contain a series of chapters devoted to analysis of specific sports and leagues. Part II of this book is composed of three chapters on popular North American team-sports leagues: the NFL, based in the USA (Chap. 3); the NHL, based in the USA and Canada (Chap. 4); and the National Basketball Association (NBA), also based in the USA and Canada (Chap. 5). Chapters on two North American individual-sports leagues make up Part III: North American Stock Car Auto Racing (NASCAR), which holds most of its races in the Southeastern USA (Chap. 6); and the Ultimate Fighting Championship (UFC), an organizer of mixed martial arts (MMA) competitions (Chap. 7). Part IV contains two studies of international team-sports leagues: the English Premier League (EPL), the top league for association football (soccer) in England (Chap. 8); and the Australian Football League (AFL), the only fully professional league of Australian Rules football (Chap. 9). The final section of this book, Part V, is devoted to two chapters on violent behavior of nonparticipants: Chap. 10 is a study of hooliganism in Greece; and Chap. 11 analyzes crime around sports stadiums in Charlotte, North Carolina.

### *Part II: North American Team Sports*

The most popular spectator sport in the USA is NFL football, and it could be argued that the NFL is also the most violent and dangerous sport for players. In Chap. 3, Janice Hauge analyzes the relationship between in-game penalties and success in the NFL, where success is defined as team-level winning percentage and postseason success. It is interesting to note that Hauge's study is the first to analyze this relationship. Hauge begins by examining the history of NFL rule changes, especially those designed to increase player safety in the face of the inherent violence

of gridiron football. Using data from the 1995 to 2009 seasons, Hauge discovers some evidence that penalties are negatively associated with team success. Although Chap. 3 is unable to directly connect attendance demand to violence and aggression, the relationship between winning and attendance implies that in-game aggression will likely impact game-day attendance in the NFL.

Another North American sport with a reputation for in-game violence and aggression is hockey. In Chap. 4, Dennis Coates, Marcel Battre, and Christian Deutscher analyze the relationship between physical play and success in the NHL, and the authors compare their NHL results to data on leagues from Finland and Germany. Coates et al. find evidence that penalty minutes and fights are negatively related to NHL team success in terms of points and attendance, but no relationship between aggressive play and points is found for the European leagues. Further analysis indicates that the negative effect of penalties on points in the NHL is due to minor penalties and the negative effect on NHL attendance is due to major penalties. Revenue data are available for the NHL, and the authors find limited evidence of a positive relationship between penalty minutes and team revenue. Taken together, this study indicates that more aggression leads to less team success on the ice (at least in the NHL), but more aggression might lead to more success at the ticket office and greater profitability. Here is clear evidence of the tradeoff that must be made when a team or league chooses to address in-game violence and aggression: reductions in physical play may lead to more wins, but such reductions may also lead to fans receiving less entertainment value.

Although the game of basketball is clearly a less violent sport than American football or ice hockey, violent play in the NBA can potentially influence the economic situation of the league and of individual teams. In Chap. 5, David Berri and Ryan Rodenberg investigate the relationship between violent and aggressive play and NBA salaries, on-court success, and team revenues. The authors first examine the role of referees in regulating the sport and in influencing outcomes. Using meta-analysis, Berri and Rodenberg find that referee “bias” has little or no effect on outcomes in the NBA. Next, the authors turn their attention to the relationship between personal fouls, salaries, and team success; using a similar meta-analysis, Berri and Rodenberg discover that players who commit more fouls earn lower salaries and generally lower their team’s odds of winning. Finally, the authors use the career statistics of Shaquille O’Neal to illustrate the impact that personal fouls (and an inability to shoot free throws) can have on wins and revenue. In sum, Chap. 5 illustrates the complex series of tradeoffs made by NBA teams when deciding their optimal level of aggressive play. For most NBA teams, it appears that more personal fouls are a net negative, but against certain teams (e.g., any team that has trouble shooting free throws) aggressive play may be a winning strategy.

### ***Part III: North American Individual Sports***

Aggressiveness is an intrinsic component of the sport of auto racing, since winning any given race entails a driver taking substantial risks. In Chap. 6, Peter von Allmen

and John Solow analyze aggressive driving in NASCAR's Sprint Cup Series and the role that it plays in the demand for NASCAR. Using a unique data set on television ratings, von Allmen and Solow find that aggressive driving is an important part of the NASCAR viewing experience. Specifically, the authors find evidence that the number of crashes is positively related, in a large and statistically significant manner, to the size of NASCAR's television audience, with an increase of one crash per race predicted to increase TV audience by about 6%. Again, we see the tradeoff between the risk and reward of violence and aggression in sports: Crashes make for great spectacle, but crashes also present a real risk to the "stars of the show," the drivers. NASCAR clearly understands this tradeoff, since it has taken numerous precautions to minimize risk to drivers, crews, and fans.

MMA is a violent fighting sport that combines the disciplines of traditional martial arts, boxing, kick boxing, and wrestling. In Chap. 7, Trevor Collier, Andrew Johnson, and John Ruggiero analyze data from MMA competitions, concentrating on individual-fight data from the UFC. The authors begin by discussing rule changes made by the UFC to rein in the more violent parts of the sport. Fighting is about violence, and MMA spectators are fans because of it, but the UFC has a significant financial stake in keeping the violence at a level that is publicly acceptable. Collier et al. then analyze the relationship between the use of aggressive fighting strategies and the probability of winning an MMA bout. Interestingly, the authors show that the type of blow landed influences judges in matches that end in decision. Specifically, violent and potentially harmful strikes appear to sway judges in the direction of the fighter who lands such blows. Furthermore, knockdowns and damage inflicted on an opponent have the largest marginal effect on judges' decisions. Although the preferences of judges do not directly reflect the preferences of fans, there can be no doubt that fighters who win, and who are best able to land violent and harmful blows, will also be the fighters who draw the largest audiences.

#### ***Part IV: International Team Sports***

Aggressive play is a strategy that has a long history in English association football. In Chap. 8, Todd Jewell estimates a demand curve for the EPL with an emphasis on the effect of aggressive play on match-day attendance. Jewell uses information on the number of fouls and the number of yellow and red cards to measure aggressive play. The author discusses the tradeoff that a team must make when choosing the optimal level of aggressive play; more aggressive play may lead to a higher probability of winning a given match, but too much aggression can lead to player expulsion and a lower probability of winning. This tradeoff is further complicated by spectator preferences for winning and for aggressive play independent of winning. The results presented in Chap. 8 show that aggressive play by EPL teams influences match-day attendance and this relationship varies by team quality; for the best EPL teams playing at home, normal fouls lead to lower attendance and yellow cards lead to higher attendance. The relationship is just the opposite for teams at the bottom of the EPL. Jewell also presents estimates of the elasticity of demand with respect to