



# The Economics of Football

SECOND EDITION

Stephen Dobson and John Goddard

# The Economics of Football

---

*Second edition*

---

Stephen Dobson

and

John Goddard



CAMBRIDGE  
UNIVERSITY PRESS

CAMBRIDGE UNIVERSITY PRESS  
Cambridge, New York, Melbourne, Madrid, Cape Town,  
Singapore, São Paulo, Delhi, Tokyo, Mexico City

Cambridge University Press  
The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United States of America by Cambridge University Press,  
New York

[www.cambridge.org](http://www.cambridge.org)

Information on this title: [www.cambridge.org/9780521517140](http://www.cambridge.org/9780521517140)

© Stephen Dobson and John Goddard 2011

This publication is in copyright. Subject to statutory exception  
and to the provisions of relevant collective licensing agreements,  
no reproduction of any part may take place without the written  
permission of Cambridge University Press.

First published 2011

Printed in the United Kingdom at the University Press, Cambridge

*A catalogue record for this publication is available from the British Library*

*Library of Congress Cataloguing in Publication data*

Dobson, Stephen.

The economics of football / Stephen Dobson, John Goddard. – 2nd ed.  
p. cm.

Includes bibliographical references and index.

ISBN 978-0-521-51714-0 (hardback)

1. Soccer—Economic aspects—Great Britain. 2. Soccer—Great Britain—  
Finance. I. Goddard, John A. II. Title.

GV943.3.D63 2011

338.4'37963340941—dc22

2010040413

ISBN 978-0-521-51714-0 Hardback

Cambridge University Press has no responsibility for the persistence or  
accuracy of URLs for external or third-party internet websites referred to in  
this publication, and does not guarantee that any content on such websites is,  
or will remain, accurate or appropriate.

## **The Economics of Football**

---

---

The second edition of this popular book presents a detailed economic analysis of professional football at club level, with new material included to reflect the development of the economics of professional football over the past ten years. Using a combination of economic reasoning and statistical and econometric analysis, the authors build upon the successes and strengths of the first edition to guide readers through the economic complexities and peculiarities of English club football. The book uses a wide range of international comparisons to help emphasise both the broader relevance as well as the unique characteristics of the English experience. Topics covered include some of the most hotly debated issues currently surrounding professional football, including player salaries, the effects of management on team performance, betting on football, racial discrimination and the performance of football referees. This edition also includes new chapters on football applications of game theory, club football around the world, and the economics of the World Cup.

STEPHEN DOBSON is Professor of Economics at Hull University Business School, Hull University.

JOHN GODDARD is Professor of Financial Economics at Bangor Business School, Bangor University.

To: My daughters Imogen and Hannah

SD

To: My family and friends

JG

## *Preface*

---

Since the early 1990s, professional football in many countries has experienced an astonishing transformation. Player salaries have risen exponentially, television contracts yield revenues on a scale unimaginable only a few years ago, many football stadia have been completely rebuilt, and the importance of commercial sponsorship and merchandising has increased beyond measure. Commercial aspects of football feature regularly in the news headlines, and the media devote pages to coverage of football finances. Football's importance is not only economic, but also social and cultural. Several million people attend matches each season, and many millions more watch football on television and follow its fortunes through coverage in the media. At the grassroots level, football's popularity as a participant sport generates benefits for the health of the population. At the highest level, international footballing success generates intangible benefits in the form of prestige and goodwill.

Academic interest in the economic analysis of football has mirrored the growth in the sport's popularity. In the US, economists have written and published books and scholarly articles on major league sports since the mid-1950s. Consequently, the older academic literature on sports economics is dominated by studies of sports such as baseball, basketball and (American) football. These writings shed light on a wide range of issues, including the determinants of the compensation received by sports professionals, the nature of joint production in team sports, competitive balance, uncertainty of outcome and the distribution of playing talent in sports leagues, and the contribution of the coach or manager to team performance. The common thread linking research into all of these topics is the formulation and testing of economic hypotheses using sports as a laboratory. A major attraction of sports to empirical economists is that the availability of data permits investigation of economic propositions that would be difficult to test in other areas, owing to a lack of suitable data.

During the last decade of the old century and the first decade of the new, scholarly papers on the economics of football have been published with increasing regularity in academic journals. Undergraduate and postgraduate students in many universities study the economics of sports as part of their degree programmes. At

the end of the 1990s, we felt that a monograph was needed to cover developments in the subject, and present a unifying overview of this relatively new area of academic research. We therefore decided to write the first edition of *The Economics of Football*, which was published by Cambridge University Press in September 2001. Since publication, we have been encouraged by the responses to the first edition we have received from scholars, students and other readers.

Since the appearance of the first edition, there has been a proliferation of scholarly work on the economics of football, in Europe and many other parts of the world. Several new academic journals have been launched, dedicated to the study of sports economics, finance and management. Football has received extensive coverage in these field journals, and in mainstream journals in economics, finance and management. Several books have been published, focusing on the economics and business aspects of football.

When Cambridge University Press suggested that we should consider preparing a new edition of *The Economics of Football*, we agreed that the time was right to revise and update the book. This second edition provides substantially revised and updated coverage of all of the key topics from the first edition. In addition, a broad range of new material reflects the growth in the scope and sophistication of the literature over the past decade. The second edition includes new chapters on football applications of game theory, football referees, football betting markets, the economics of club football around the world, and the World Cup. As before, our objective is to present a wide-ranging overview of the current state of theoretical and empirical research on the economics of football.

## *Acknowledgements*

---

We would like to thank colleagues and students at the Department of Economics, Otago University; Bangor Business School, Bangor University; and the School of Business and Economics, Swansea University for their direct and sometimes unknowing help towards the development of this project. We would like to give special thanks to Rick Audas, Tunde Buraimo, Andy Cooke, Juan Carlos Cuestas, Peter Dawson, Neil Doncaster, David Forrest, Rodney Fort, Bill Gerrard, Leo Kahane, Ruud Koning, Huw Lloyd Williams, Phil Molyneux, Dorian Owen, Phil Quinn, Rob Simmons, Peter Sloane, Frank Stähler, Sarah Wale, Yizheng Wang, Leighton Vaughan Williams and John Wilson.

We would also like to thank a number of staff at Cambridge University Press for their assistance during the development of this project. In particular, we are grateful to Chris Harrison (Publishing Director, Social Sciences) for his unfailing support and encouragement, and Philip Good (Assistant Editor, Economics and Business) for his advice and guidance. We are grateful to Matt Davies of Out of House Publishing Solutions Ltd for his assistance during the process of production, and Penny Harper (copy-editor) for her meticulous efforts in checking and correcting the original manuscript.



# Contents

---

<i>Preface</i>	page xi
<i>Acknowledgements</i>	xiii
<i>List of figures</i>	xiv
<i>List of tables</i>	xv
<b>1 Introduction</b>	1
1.1 <i>The economics of professional team sports: three seminal contributions</i>	2
1.2 <i>Outline of this volume</i>	8
<b>2 The economic theory of professional sports leagues</b>	12
2.1 <i>The North American professional team sports model</i>	14
2.2 <i>A model of an n-team league</i>	19
2.3 <i>A model of a two-team league</i>	23
2.4 <i>Revenue sharing</i>	27
2.5 <i>Restraints on expenditure on players' salaries</i>	33
<b>3 Competitive balance, uncertainty of outcome and home-field advantage</b>	42
3.1 <i>Measuring competitive balance and competitive inequality</i>	42
3.2 <i>Home-field advantage</i>	50
3.3 <i>Distributional properties of the goals scored by the home and away teams</i>	59
3.4 <i>Good and poor sequences, and persistence in football match results</i>	67
<b>4 Forecasting models for football match results</b>	79
4.1 <i>Previous literature on modelling and forecasting match results in football</i>	79
4.2 <i>A goals-based forecasting model</i>	82
4.3 <i>Probabilistic forecasts for match results in 'scores' format</i>	88

4.4	<i>A results-based forecasting model</i>	95
4.5	<i>Probabilistic forecasts for match results in 'win-draw-lose' format</i>	98
4.6	<i>Evaluation of the goals-based and results-based forecasting models</i>	100
<b>5</b>	<b>Game theory and football games</b>	106
5.1	<i>The penalty kick</i>	107
5.2	<i>A game-theoretic model of in-play strategic choice for football teams</i>	111
5.3	<i>The timings of player dismissals and goals</i>	119
5.4	<i>An empirical model for the in-play arrival rates of player dismissals and goals</i>	122
5.5	<i>Estimation results and interpretation</i>	124
5.6	<i>Stochastic simulations for in-play match result probabilities conditional on the current state of the match</i>	130
<b>6</b>	<b>English professional football: historical development and commercial structure</b>	139
6.1	<i>English professional football: competitive structure and team performance</i>	139
6.2	<i>Match attendances</i>	150
6.3	<i>Financial structure of English football: overview of profit and loss accounts</i>	159
6.4	<i>Gate revenues and admission prices</i>	162
6.5	<i>Broadcast revenues</i>	171
6.6	<i>Football's labour market: players' salaries and the transfer system</i>	179
6.7	<i>Ownership, governance and finance</i>	186
<b>7</b>	<b>Determinants of professional footballers' salaries</b>	197
7.1	<i>The compensation of professional footballers</i>	198
7.2	<i>The economics of superstars</i>	201
7.3	<i>Rank-order tournaments and intra-team earnings distributions</i>	204
7.4	<i>Determinants of players' compensation: empirical evidence</i>	209
<b>8</b>	<b>Professional footballers: employment patterns and racial discrimination</b>	216
8.1	<i>Employment mobility, migration and career structure in English football</i>	217
8.2	<i>International migration of professional footballers</i>	227
8.3	<i>Racial discrimination in professional team sports</i>	236
<b>9</b>	<b>The football manager</b>	249
9.1	<i>The role of the football manager</i>	251
9.2	<i>Measuring the managerial contribution: the production frontier approach</i>	254

9.3	<i>Patterns of managerial change in English football</i>	260
9.4	<i>Determinants of managerial change</i>	270
9.5	<i>Estimation of hazard functions for managerial departure</i>	276
9.6	<i>The effect of managerial change on team performance</i>	285
9.7	<i>Managerial succession effects in English football</i>	289
<b>10</b>	<b>The football referee</b>	295
10.1	<i>The role of the football referee</i>	296
10.2	<i>Favouritism and referee behaviour</i>	298
10.3	<i>The incidence of disciplinary sanction in English Premier League football</i>	303
<b>11</b>	<b>Spectator demand for football</b>	321
11.1	<i>Econometric analysis of football attendances</i>	322
11.2	<i>Modelling the demand for attendance at English league football, 1947–1997</i>	336
11.3	<i>Explaining base attendances, and the loyalty, league position, price and goals scored coefficients</i>	346
<b>12</b>	<b>Gambling on football</b>	352
12.1	<i>Previous evidence on the informational efficiency of football and other sports betting markets</i>	353
12.2	<i>A forecasting model for half-timelfull-time match outcomes</i>	365
12.3	<i>Comparing the model's probabilistic forecasts with betting odds</i>	367
12.4	<i>Testing the informational efficiency of the half-timelfull-time fixed-odds betting market</i>	371
<b>13</b>	<b>Football around the world: France, Germany, Brazil, Japan and China</b>	380
13.1	<i>France</i>	380
13.2	<i>Germany</i>	385
13.3	<i>Brazil</i>	391
13.4	<i>Japan</i>	395
13.5	<i>China</i>	399
<b>14</b>	<b>The economics of the World Cup</b>	405
14.1	<i>The World Cup</i>	407
14.2	<i>Costs and benefits of hosting a mega sporting event</i>	409
14.3	<i>Prospective economic impact studies</i>	413
14.4	<i>Retrospective economic impact studies</i>	415
14.5	<i>Intangible benefits of mega events</i>	417
	<i>References</i>	423
	<i>Index</i>	447

## *Figures*

---

2.1 Profit-maximisation and win-percent-maximisation equilibria: two-team closed model	<i>page 25</i>
2.2 Profit-maximisation and win-percent-maximisation equilibria: two-team open model	26
2.3 Revenue sharing in a closed model: profit maximisation	28
2.4 Revenue sharing in a closed model: win-percent maximisation	29
2.5 Nash equilibrium and joint profit-maximisation equilibrium: profit-maximisation model	31
2.6 Luxury tax: closed model	34
2.7 Luxury tax: open model	35
2.8 Payroll cap: closed model	36
2.9 Payroll cap: open model	37
2.10 G14 payroll cap: closed model	38
2.11 G14 payroll cap: open model	39
3.1 The Lorenz curve and Gini coefficient	46
6.1 Percentage shares in aggregate performance of clubs in Groups 1 to 5	150
6.2 Percentage shares in aggregate attendance of clubs in Groups 1 to 5	154
6.3 Percentage shares in aggregate gate revenue of clubs in Groups 1 to 5	168
7.1 Optimum investment in playing talent, rank-order tournament model	208

## Tables

---

3.1	Percentages of home wins, draws and away wins, average numbers of goals scored by the home and away teams, and win percentages per season, English league, 1970–2009 seasons	page 54
3.2	Home-team success percentages (2/1/0 points for W/D/L) by tier (division) in five-season bands, English league, 1970–2009 seasons	56
3.3	Percentages of home wins, draws and away wins, and average numbers of goals scored by home and away teams, international comparisons, 1973–2009 seasons	57
3.4	Joint and marginal percentage distributions of goals scored by home and away teams, English league, 1970–1981 seasons	60
3.5	Joint and marginal percentage distributions of goals scored by home and away teams, English league, 1982–2009 seasons	60
3.6	Percentage distribution of goals scored by the home team, conditional on the number of goals scored by the away team, English league, 1982–2009 seasons	61
3.7	Percentage distribution of goals scored by the away team, conditional on the number of goals scored by the home team, English league, 1982–2009 seasons	62
3.8	Parameter estimates for fitted double and bivariate Poisson and negative binomial distributions, home- and away-team goals data, English league, 1982–2009 seasons	66
3.9	Hypothesis tests for comparisons between fitted double and bivariate Poisson and negative binomial distributions, home- and away-team goals data, English league, 1982–2009 seasons	68
3.10	Longest runs of consecutive results, English league, 1970–2009 seasons	69
3.11	Empirical unconditional and conditional match result probabilities	70
3.12	League table, Premier League, 2009 season, and ordered probit team quality parameter estimates	72
3.13	Simulated unconditional and conditional match result probabilities	74
3.14	Tests for persistence in sequences of consecutive match results	75
4.1	Goals-based forecasting model: estimated coefficients and p-values	85

4.2	Data for calculation of average goals scored and conceded covariates, Hull City vs Tottenham Hotspur fixture	89
4.3	Data for calculation of goals scored and conceded in recent matches covariates, Hull City vs Tottenham Hotspur fixture	91
4.4	Estimated match result probabilities, Hull City vs Tottenham Hotspur fixture	95
4.5	Results-based forecasting model: estimated coefficients and p-values	97
4.6	Fitted match result and selected score probabilities, Premier League, weekend of 21–23 February 2009	102
4.7	Pseudo-R-square values for forecasting performance, 2009 season: goals-based forecasting model, and probabilities derived from six betting firms' prices	104
5.1	Observed proportions of penalty kicks, goalkeeper dives and goals	110
5.2	Hypothetical goal-scoring and player-dismissal probabilities for numerical examples	114
5.3	Determination of the two teams' optimal strategies for the 90th minute, home team leading by one goal after 89 minutes	115
5.4	Determination of the two teams' optimal strategies for the 90th minute, scores level after 89 minutes	116
5.5	Hypothetical match result probabilities at the end of the first minute, conditional on score and player dismissals, for numerical examples	118
5.6	Determination of the two teams' optimal strategies for the first minute	118
5.7	Rates of player dismissal and goal scoring conditional on current duration, English League, T1–T4, 2002–2009 seasons	119
5.8	Rates of player dismissal and goal scoring conditional on current difference in scores, English League, T1–T4, 2002–2009 seasons	120
5.9	Rates of player dismissal and goal scoring conditional on numerical disparity in players, English League, T1–T4, 2002–2009 seasons	120
5.10	Estimation results: player-dismissal hazard functions	125
5.11	Estimation results: goal-scoring hazard functions	128
5.12	Home-win probabilities, conditional on relative team strengths and the state of the match at various durations	132
5.13	Draw probabilities, conditional on relative team strengths and the state of the match at various durations	133
5.14	Away-win probabilities, conditional on relative team strengths and the state of the match at various durations	134
5.15	In-play home-win/draw/away-win probabilities: illustration	136
6.1	Historical performance of top English teams in league and cup competition	144
6.2	Incidence of giant-killings in FA Cup ties, 1974–2009	147
6.3	Group definitions	148
6.4	English league attendances, aggregate and by tier	151
6.5	Average revenue, wages and salaries and operating profit per season, three-season periods, English League, 1994–2008 seasons	160

6.6	Financial data, leading English clubs and averages by tier, 2008 season, £m	161
6.7	TV and other revenue, leading English clubs and averages by tier, 2008 season, £m	162
6.8	English league average admission prices	164
6.9	English league gate revenues	166
6.10	Revenue from sale of broadcast rights, English Premier League, average per season, 1993–2010 seasons, £m	174
6.11	Average net transfer expenditure within the Premier League/Football League per season, selected three-season periods, £m	185
6.12	Average flows of transfer expenditure within the Premier League/Football League per season, 2006–2008 seasons, £m	185
6.13	Gross transfer expenditure of Premier League and Football League clubs per season, 2001–2008 seasons, £m	186
6.14	Average gross transfer expenditure and average revenue per season, three-season periods, 1994–2008 seasons, £m	186
7.1	Average basic footballer's salary by tier, English League, 2000 and 2006 seasons, £	199
8.1	Employment totals for professional footballers by tier, English League, 1986–2009	218
8.2	Percentage distribution of professional footballers in England by age band and tier, English League, selected years	219
8.3	Percentage distribution of professional footballers in England by month of birth, English League, selected years	220
8.4	Employment totals for professional footballers by birthplace (country), English League, 1986–2009	221
8.5	Total numbers of professional footballers by birthplace (country) and tier, English League, selected years	222
8.6	Percentage distribution of footballers by birthplace (region) and location of club (region), English League, 1989	223
8.7	Percentage distribution of footballers by birthplace (region) and location of club (region), English League, 1999	224
8.8	Percentage distribution of footballers in England by birthplace (region) and location of club (region), English League, 2009	225
8.9	Four-year employment transition probabilities by tier, English League, 1989–1993	226
8.10	Four-year employment transition probabilities by tier, English League, 1993–1997	227
8.11	Four-year employment transition probabilities by tier, English League, 1997–2001	228
8.12	Four-year employment transition probabilities by tier, English League, 2001–2005	229
8.13	Four-year employment transition probabilities by tier, English League, 2005–2009	230

8.14	Cross-tabulation of squad players' home countries and countries of employment, Euro 2000	233
8.15	Cross-tabulation of squad players' home countries and countries of employment, Euro 2008	234
8.16	Estimation results: initial divisional status	243
8.17	Estimation results: retention	244
8.18	Estimation results: divisional transition	245
9.1	Managerial spells ranked by duration (matches), English League, 1973–2009 seasons	261
9.2	Managerial spells ranked by win ratio, English League, 1973–2009 seasons	263
9.3	Managerial departures, by season, English League, 1973–2009 seasons	267
9.4	Average number of managerial departures per season, four-season bands, English League, 1974–2009 seasons	268
9.5	Managerial departures by month, English League, 1974–2009 seasons	269
9.6	Managerial departures by tier, four-season bands, English League, 1974–2009 seasons	269
9.7	Average duration (matches completed) of terminating managerial spells, four-season bands, English League, 1974–2009 seasons	270
9.8	Average duration (matches completed) and average win ratio, in terminating managerial spells by tier, English League, 1974–2009 seasons	271
9.9	Distribution of complete and right-censored managerial spells by duration (in matches), crude estimates of the survivor, distribution, hazard and probability functions, English League, 1973–2009 seasons	280
9.10	Involuntary and voluntary managerial job departure hazard functions: estimation results	282
9.11	The managerial succession effect: estimation results	292
10.1	Numbers of yellow cards incurred by the home and away teams, English Premier League, 1997–2009 seasons	303
10.2	Numbers of red cards incurred by the home and away teams, English Premier League, 1997–2009 seasons	303
10.3	Sample frequency distribution for the bivariate disciplinary points dependent variable, $\{Z_{1,j}, Z_{2,j}\}$	305
10.4	Unconditional model: fitted bivariate probabilities and observed proportions for the numbers of disciplinary 'points' incurred by the home and away teams	307
10.5	Average numbers of yellow and red cards awarded per match by team, English Premier League, 1997–2009 seasons	311
10.6	Average numbers of yellow and red cards and disciplinary 'points' awarded per match by referee, English Premier League, 1997–2009 seasons	314
10.7	Rule changes and changes of interpretation, by season	316



10.8	Average numbers of yellow cards, red cards and disciplinary ‘points’ awarded per match by season, English Premier League, 1997–2009 seasons	317
11.1	Stadium capacity, average attendance, capacity utilisation, 2009 season T1 clubs, 1979, 1989, 1999 and 2009	325
11.2	Attendance model: first-stage estimation results	340
11.3	Attendance model: second-stage estimation results	347
12.1	Probabilities for half-time/full-time outcomes	369
12.2	Mean returns based on bookmakers’ ‘best odds’	370
12.3	Illustration of ‘highest expected return’ betting strategy: English Premier League, 11 May 2003	372
12.4	Returns from ‘highest expected return’ and indiscriminate betting strategies	374
12.5	Average rate of return by tier (division): chronological analysis	376
12.6	Mean expected and actual returns: all possible bets ranked by expected return	377
13.1	Historical performance of top French teams in league and cup competition	382
13.2	Average league attendances, France Ligue 1 and German Bundesliga 1, 1981–2010 (’000)	385
13.3	Revenue, costs and profitability, aggregates and breakdown, France, all Ligue 1 clubs, selected years (€m)	386
13.4	Historical performance of top German teams in league and cup competition	388
13.5	Revenue, costs and profitability, aggregates, Germany, all Bundesliga 1 clubs, selected years (€m)	391
13.6	Historical performance of top Brazilian teams in league and cup competition	393
13.7	Percentage breakdown of total revenue, twenty-one Brazilian clubs, 2004–2007	394
13.8	J. League winners and runners-up, Japan, 1993–2009	397
13.9	Average attendance, revenue and salary expenditure, Japan, J1 clubs, 1999–2008 (¥m)	399
13.10	Football League and Super League winners and runners-up, China, 1994–2009	400
14.1	History of the World Cup	408