



***Measuring Competitive Balance
and Uncertainty of Outcome
Hypothesis in European Football***

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The Concept of Competitive Balance



“The nature of the industry (of baseball) is such that competitors must be of approximate equal size if any are to be successful” (Rottenberg, 1956).

Competitive Balance is literally the balance between the sporting capabilities of teams (Michie & Oughton, 2004).

Why Competitive Balance?

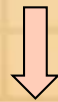
Competitive Balance is an important concept for professional team sports



Creates an uncertainty of outcome



Instigates the interest of sport fans



Increased demand for sport events

(El-Hodiri & Quirk, 1971; Rottenberg, 1956).



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The Aim of the study



- Identify the best or optimal index for the study of study of competitive balance in European football.
 - According to Zimbalist (2003), any index which better captures fans' interest will be the best candidate.
- An econometric model is constructed based on the longstanding Uncertainty of Outcome Hypothesis (Fort & Maxcy, 2003).
 - UOH analyses the relationship between competitive balance and fans' interest.

Conventional Indices of Competitive Balance

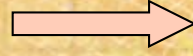
- *Seasonal Dimension*
 - *National Measure of Seasonal Imbalance (NAMSI)* (Goossens, 2006).
 - *Herfindahl-Hirschman Index (HHI*)* (Owen et al., 2007).
 - *Adjusted Gini Coefficient (AGini)* (Utt and Fort, 2002).
- *Between Seasons Dimension*
 - *Kendall's tau coefficient (τ)* Groot (2008).
 - *G index* (Buzzacchi, Szymanski, and Valletti 2003).

Three Stage Special Seasonal Indices

(Manasis, Avgerinou, Ntzoufras, & Reade, 2013)

1st Stage:

Championship Title

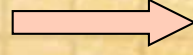


NCR_1

The Normalized Concentration Ratio for the Champion (NCR_1) interprets the Champion's degree of domination

2nd Stage

European Tournaments

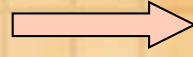


ACR_K

The Adjusted Concentration Ratio (ACR_K) interprets the domination degree of the Top K teams as well as competition degree among the Top K teams

3rd Stage

Relegation



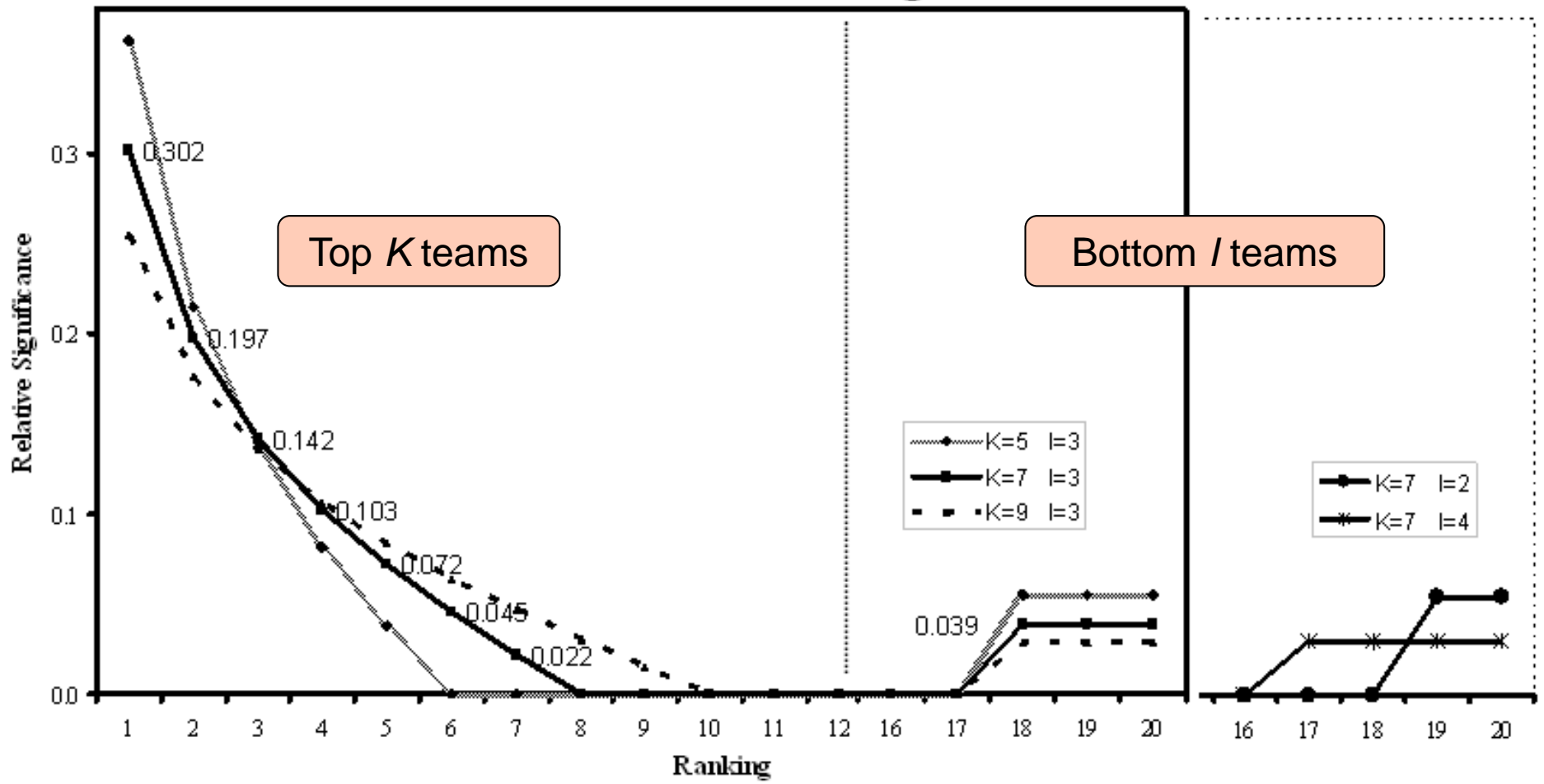
NCR^l

The Normalized Concentration Ratio for relegated teams (NCR^l) interprets the degree of weakness of the l relegated teams

SCR_K^l

The Special Concentration Ratio (SCR_K^l) is an all inclusive index which refers to all three stages

Figure 4.6: Relative Significance in SCR_K^I for $K=5, 7, 9$ and $I=2, 3, 4$ in a 20-team League



Between Seasons and Bi-dimensional Three Stage Indices

- Between seasons indices:
 - Dynamic Index for the Champion (DN_1)
 - Adjusted Dynamic Index (ADN_K)
 - Dynamic Index for Relegated Teams (DN')
 - Special Dynamic Index (SDN_K^I).
- Bi-dimensional indices:
 - Dynamic Concentration for the Champion (DC_1)
 - Adjusted Dynamic Concentration (ADC_K)
 - Dynamic Concentration for Relegated Teams (DC')
 - Special Dynamic Concentration (SDC_K^I).

Collected Dataset

<i>Countries</i>	<i>Seasons</i>	
	<i>from</i>	<i>to</i>
<i>Greece</i>	1959/60	2008/09
<i>Italy</i>	1959/60	
<i>France</i>	1959/60	
<i>Germany</i>	1963/64	
<i>Belgium</i>	1966/67	
<i>England</i>	1959/60	
<i>Sweden</i>	1959/60	
<i>Norway</i>	1963/64	

7 seasonal, 7 between season and 4 bi-dimensional competitive balance indices

Variables & Data

➤ Annual unbalanced panel dataset with eight cross units (n =leagues) over ~50 years (T =seasons).

➤ Dependent or response variable:

➤ $\ln ATT$: Attendance at football games

➤ Independent or explanatory variables:

❑ $\ln CB$: Index of competitive balance

❑ $\ln POP$: Annual attendance per game to account

❑ $\ln RGN$: Real per capita gross national disposable income

❑ $\ln Un$: The labor supply based on fans of attendance database

❑ $d97$: A dummy variable for the period after season 1997

❑ t & t^2 : variables for time effects

➤ The natural demand curve for football is not linear, but a sensible elasticity measure is needed to capture the relationship between attendance and the independent variables and to provide a systematic way of testing the model.

➤ This form also allows for a more reliable interpretation of the effect of the independent variables on attendance.

including site and effect of European football available in the demand function.

Econometric Model

- The nature of data (macro panel or temporal dominated) urges to the test the non-stationarity issue.
- Based on the results from the ADF-Fisher Panel Unit Root Tests, an Autoregressive Distributed Lag (*ADL*) model is selected (Banerjee, Dolado, Galbraith, & Hendry, 1993; Hendry & Doornik, 2009; Hendry & Nielsen, 2007).
- The eight equations (one for each country) are pooled together so as to improve efficiency (Kennedy, 2008).

Methodology

➤ Pooled data using Ordinary Least Squares (*OLS*) often violates assumption for the properties of the errors (Hicks, 1994).

- ❑ Errors tend to be serially (within countries) and contemporaneously (across countries) correlated.
- ❑ Errors also tend to be heteroskedastic due to data volatility.

➤ A common alternative technique to improve the model is the *Seemingly*

Unrelated Regressions (SUR) estimation, which is an *Estimated Generalised Least Squares* approach (*EGLS*) (Greene, 2008). The errors contain the influence on attendance of structural factors that have been omitted from the equation. Such factors might include:

- Impact from TV broadcasting
- Advent of advertising and sponsoring
- High-tech stadium infrastructure
- Progress in technology manufacturing football material.

Many countries (i.e. population) are not independent across years because of the substantial difference both in size and population among the examined European countries.

Long-run Elasticity Effect on Attendance (SDC_K^I on the model)

<i>Variables</i>	<i>Elasticity</i>
$\ln POP$	4.591***
$\ln RGNI$	0.534***
$\ln UN$	0.141***
t	-0.821***
t^2	0.001***
$d97$	0.227

***significant at $\alpha=1\%$

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- Attendance ($\ln ATT$) is highly elastic to population ($\ln POP$)
- 1% increase in national population increases football attendance by almost 5%.

***significant at $\alpha=1\%$

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- Fans' buying power has little effect on their decision to attend a football game.
- Attendance is income inelastic and definitely not a luxury good.
- The positive coefficient suggests that attendance is a normal good.

***significant at $\alpha=1\%$

Long-run Elasticity Effect on Attendance (SDC_K^I on the model)

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$\ln POP$	4.591***
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t	-0.821***
t^2	0.001***
$d97$	0.227***

The sign effect of unemployment rate on attendance accords with the assumptions for a positive effect justified by social factors.

***significant at $\alpha=1\%$

Estimated Long-run Elasticity Effect on Attendance (SDC_K^I on the model)

<i>Variables</i>	<i>Elasticity</i>
$\ln POP$	4.591***
$\ln RGNI$	0.534***
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t	-0.821***
t^2	0.001***
$d97$	0.227***

***significant at $\alpha=1\%$

- Quadratic trend was detected
- The lowest point is found to be around the middle of the 1990's.
- The trend variable may capture factors that affect demand for attendance that change systematically over time (changes in consumer preferences spending leisure time, competition from related sports and entertainment product industry goods).
- **Interpretation:** Early 1960's football in Europe was a highly respectable social phenomenon. Afterwards modern forms of social events enter the entertainment industry while football remains stagnant and struggles with hooliganism. During the last two decades, the adoption of management and marketing practices by clubs and federations, the construction of high-tech stadiums, and the great exposure by the media have given a new noticeable boost to football.

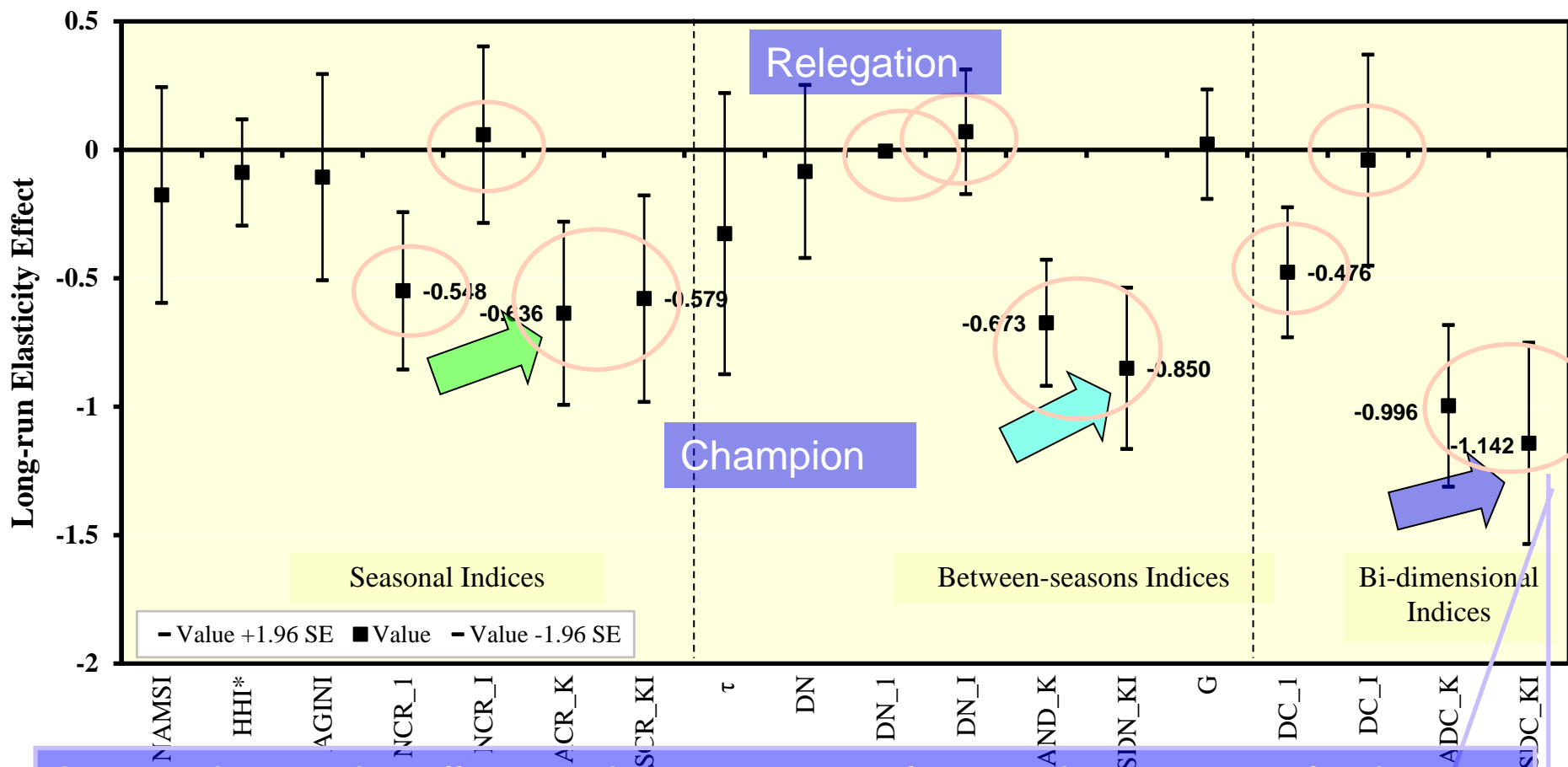
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***significant at $\alpha=1\%$

The dummy variable $d97$ effect suggests a combined BOSSMAN and Champions league effect of approximately 25% for SDC increase in attendance (ranges from 17% - 25% for all indices)

Long-run Elasticity and 95% Confidence Intervals of the Effect of Competitive Balance Indices on Attendance



As more impressive effect are the 15.333 more fans per league game for the worst (2007) and best (1961) seasons in England. Evidently, this effect has an inconsiderably large economic impact in total revenues both from attendance and other related sources such as marketing, sponsoring, merchandising and parking revenues.

Main Remarks

- Conventional indices are not found to have a significant effect on attendance; the information gathered fails to capture the fan's interest.
- Also, Relegation is not found to have a significant effect. This is related with the discussion for the promotion-relegation rule by the US-owners of English teams coveting to move to North-American closed-league system.
- Given the qualities of ACR_K , it may be assumed that fans are mostly interested in the seasonal performance of the teams at the top of the ladder.
- By comparing seasonal and between seasons indices, ranking mobility across seasons captures more effectively the fans' interest than seasonal performance.
- The bi-dimensional indices have a greater effect on attendance than the corresponding seasonal and between-seasons indices. This signifies that bi-dimensional indices solve any collinearity issue between indices.
- Further examination of the most important indices may prove to be a powerful tool for an in-depth analysis of competitive balance since it reveals interesting facts for league officials.