



MEASURING EFFICIENCY AND PRODUCTIVITY IN PROFESSIONAL FOOTBALL TEAMS: EVIDENCE FROM THE ENGLISH PREMIER LEAGUE

Isidoro Guzmán^{1*} and Stephen Morrow²

¹Departamento de Economía Financiera y Contabilidad, Universidad Politécnica de Cartagena, Calle Real, 3, 30201 Cartagena, Spain.

²Departments of Sport Studies, University of Stirling, FK9 4LA Stirling, Scotland.

*Corresponding author, to whom more information request should be addressed (e-mail: isidoro.guzman@upct.es)

Additional keywords: data envelopment analysis, football, economics, efficiency, canonical correlation analysis, Malmquist productivity index.

INTRODUCTION

British football clubs are unusual businesses. While the debate about the objectives of football clubs is not new, the substantial increase in income within football since the 1990s has given it greater prominence among stakeholders. More fundamentally the presence of non-financial objectives also raises the question of how to measure the performance of football clubs.

Ratio analysis has been commonly used to assess the financial performance of companies, this analysis being based on company financial statements. Univariate financial analysis involves the examination and discussion of one ratio at a time, with a view to drawing tentative conclusions by comparing the result of that ratio with some yardstick of comparison. However, the use of univariate financial analysis has limitations.

In the 1970s the use of multivariate financial analysis became more prevalent, with techniques like multi discriminant analysis and logit being widely used, particularly in the area of predicting corporate failure. More recently techniques have emerged in operational research that is concerned with measuring efficiency (Guzmán,2006).

METHODOLOGY

One such technique is Data Envelopment Analysis (DEA), a linear programming method to evaluate the relative efficiency of a number of producers or decision-making units (DMUs), comparing the levels of inputs and outputs of one DMU with its competitors. The attractiveness of DEA is that the derivation of the performance efficiency index is dependent on a mixture of physical data and other types of information. Development of DEA to include information from the financial statements is of particular interest in this research as it “seeks to determine whether financial statements information can yield any useful insights into efficiency. . .” But, while accounting numbers can be variables in DEA, its attractiveness is that other non-financial inputs and outputs may also be included.

To ensure the cohesion of the input– output variables within the DEA models, the statistical test of Canonical Correlation Analysis (CCA) is used to derive the efficiency scores (Guzmán and Morrow, 2007). Once a definitive DEA model has been obtained, an additional study is undertaken into variations of efficiency scores using the dynamic efficiency measure, Malmquist total factor productivity index. It measures the change in productivity between two data points by calculating the ratio of the distances of each data point relative to a common technology.

DATA

For our study we consider the professional football clubs playing in the English Premier League on six seasons from 1997-1998 to 2002-2003. The outputs used in the current study are: points won in a season and total revenue for the corresponding financial year. In the input side, three variables are selected: staff costs, directors’ remuneration and the general or other operating expenses of each club.



CONCLUSIONS

The aim of this study was to analyze the efficiency of clubs in the FA Premier League using non-parametric models to obtain production frontiers. Relatively high mean efficiency scores were reported for the sample of all clubs for all six seasons taken together for the revised DEA model (definitive model, efficiency mean value: 0.846), the latter derived after the application of canonical correlation theory. Focusing on definitive model for the most recent 2002–2003 season, at the level of individual clubs some interesting results were generated: for example, some clubs which enjoyed success on the field (league position in brackets), notably Arsenal (2nd), Chelsea (4th) and Liverpool (5th), achieved relatively low efficiency scores, while other clubs that enjoyed less on-field success were efficient, notably Birmingham (13th) and West Bromwich Albion (19th). For the same season, the mean values of all clubs taken together indicated that they were operating at an efficiency level close to 80%. Looking ahead therefore, arguably the best way for inefficient teams to become more efficient is to focus their attention on radially reducing their inputs by approximately 20%.

The study also analyzed variations in performance between seasons 1997–1998 and 2002–2003 using the TFP. Restricting the study to the eleven clubs that participated in the FA Premier League in all of these seasons, the results indicate that for mean values most clubs report an index value of less than 1, indicating that they do not experience any gain in the level of productivity. When the Malmquist total factor productivity index is deconstructed, two key points emerge: first, technological change offers a positive displacement of the efficiency frontiers along the evaluated periods, and second, catching-up presents a negative trend, resulting in a value of less than 1 in the final season, suggesting that clubs provide poorer performance in terms of movements in the efficient frontiers over the six seasons.

Overall this research shows that DEA can be a suitable tool for measuring the efficiency of professional football clubs. If the technique is applied together with CCA, it is possible to obtain DEA models with acceptable levels of correlation for a given set of data. This study suggests opportunities for future research, notably extending it to other countries and generating further DEA models that simultaneously consider different economic and technical variables that may influence the performance of professional football clubs.

LITERATURE CITED

- GUZMÁN, I. (2006). Measuring efficiency and sustainable growth in Spanish football teams, *European Sport Managements Quarterly (ESMQ)*, vol. 6 (3): 267-287.
- GUZMÁN, I. and MORROW, S. (2007). Measuring efficiency and productivity in professional football teams: evidence from the English Premier League, *Central European Journal of Operations Research*, vol.15 (4): 309-328.

Technology and Knowledge Transfer e-Bulletin (<http://bulletin.upct.es>) is devoted to the publication of patents and summaries of works carried out by the researchers of the Universidad Politécnica de Cartagena (Technical University of Cartagena). More information regarding the results published in this bulletin should be solicited to the corresponding author.

The opinions expressed in articles appearing in Technology and Knowledge Transfer e-Bulletin are those of the authors and do not necessarily reflect the official view of the Universidad Politécnica de Cartagena.

Editor: María José Vicente (maria.vicente@upct.es)
Administration and support: Document Service

ISSN 2172-0436