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An option pricing framework for valuation of football players

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Abstract

In this paper we develop a contingent claims framework for determining the financial value of professional football players. Contingent claims style modelling is used to develop two models. The pricing of football players is based on a performance index such as the Carling Opta Index. Unexpected events such as injuries are included into the models as Poisson jump processes. The value of a player varies from club to club, depending on club turnover and the total number of performance points generated by the entire team.

Keywords: Real options; Investment analysis; Geometric Brownian motion; Jump processes; Ito's lemma

1. Introduction

In this paper we use contingent claims methodology and standard techniques in stochastic calculus to develop a framework for determining the financial value of professional football players to prospective acquiring clubs. The question is of vital interest to a sport that has become an industry in its own right. As the amount of money generated by the football industry grows exponentially year by year, it is punctuated by record financial deals negotiated between the football clubs and the players they hire.

Given the worldwide popularity of football and the significance of the players themselves as financial assets, surprisingly little academic literature is available on the question of how to determine a players' financial value to a club. In fact, the literature on major determinants from a financial economics point of

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view (Dawson, Dobson, & Gerrard, 1999; Syzmanski & Kuypers, 1999; Syzmanski & Smith, 1997), is very sparse. The majority of studies in this area concentrate on statistical modelling for score forecasting, as in Dixon and Robinson (1997), Maher (1982) or Stern (1991), or on prediction of the players or team performance, like Bennet and Flueck (1983), Berri (1999) or Carmichael, Thomas, and Ward (2000).

The novelty of this paper, then, is that it is the first published, rigorous framework for valuing football players. Using a performance index such as the Opta Index (http://www.opta.co.uk), we explicitly model the uncertainty surrounding a player's performance, including injury events. We also consider the uncertainty surrounding club income, including the revenue from player's performance as well as those due to player's image, club image, fan loyalty, the economy at large, etc.

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The rest of the paper is organised as follows. In the next section we outline the ongoing status of the football industry and its probable evolution. In Section 3 we describe how a player's performance can be measured with a performance index such as the Opta Index. In Sections 4 and 5 we develop the model and in Section 6 we discuss how it can be extended to incorporate managerial flexibility when dealing with exchanges of players or latent development. Section 7 concludes.

2. The football industry

2.1. The clubs

The Sports Business Group at Deloitte Touche, the international consultancy (http://www.deloitte.com), provide some indications of the financial strength of football in their Annual Review of Financial Finance (Deloitte & Touche, 2000, 2003). Income growth within leading Premier Leagues over 5 years to 2001 has been significant: 28% in Spain, 22–24% in England, France and Italy and 15% in Germany. The income generated by the English Premiership for the season 2002–2003 was £1246 million, an increase of 10% over the previous season and of 61% since season 1999–2000. In season 2003–2004 the estimated figure for revenue is £1.33 billion. The current UK TV deal for the premier league alone is worth £2 billion for 3 years, with more revenue being generated by cup competitions, the Nationwide league and Europe. Manchester United are famously the richest club in the world. For the year to 31st July 2001, the clubs turnover increased by 12% to £129.6 million, with pre-tax profit rising to £21.8 million, with sponsorship income contributing £22.5 million, gate receipts (on average attendances of 67,100) £46.2 million, and income from TV £31.2 million. The club's Champions League income was £19.2 million, while its strategic alliance with Nike, begun in August 2002, is expected to be worth £303 million (Manchester United, Annual Report and Accounts 2001). Its income in financial year 2002–2003 has risen to 175 million. The club's recent growth is indicated by the position that the corporation holds in the Footsie 500. At number 233, as of November 30, 2000 (Waterlow Stock Exchange Yearbook 2001, Waterlow: London), the club has achieved a higher ranking than many more traditional business names. The English champions are not alone in producing such remarkable figures, and in general the 1990s have witnessed exceptional growth in the financial strength of association football clubs throughout Europe. Much of this income growth has resulted from the increase of television revenues following the establishment of the Union of European Football Associations (UEFA) Champions