Is There a Moneyball-Type Inefficiency in the EPL Soccer Players' Labour Market?

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Introduction
It is widely assumed that, under conditions of free agency, players' labour markets in pro team sports are highly efficient in their use of available information to set player wages. However, as Moneyball has highlighted, there are instances in which players' labour markets even with free agency have behaved inefficiently for significant periods of time. Research in this area in European pro team sports has been restricted by the lack of reliable and publicly available data on individual player wages. Instead the only reliable data has been at the team-level from audited company accounts. The purpose of this presentation is to propose a simple team-level test for efficiency in the players' labour market and to apply this test to data for the English Premier League (EPL).

Literature Review
In the book, Moneyball: The Art of Winning an Unfair Game (Lewis, 2003), it is argued that the success of the Oakland A’s in reaching the MLB play-offs in seasons 2001 and 2002 despite having one of the smallest wage budgets was due to the use of statistical analysis to exploit market inefficiencies in the valuation of baseball players. Hakes and Sauer (2006) show that there was indeed substantial market inefficiency in the MLB players’ labour market arising primarily from neglecting the value of hitters being walked to base. Hakes and Sauer showed that, prior to the publication of Moneyball, on-base percentage (OBP), which includes walks, was an insignificant predictor of player salaries yet is the strongest predictor of team win%. Oakland exploited this “free lunch” until 2004 when, as economic theory would predict, the market eventually corrected the inefficiency and OBP became a significant influence on player salaries.

It is well established that European pro team sports exhibit financial determinism with a strong association between team performance and wage expenditure (as first demonstrated in English pro soccer by Szymanski and Smith, 1997, and Szymanski and Kuypers, 1999), particularly in those sports with relatively limited regulation of the players’ labour market. But the lack of reliable player-level data on wages has limited the investigation of market efficiency. Dobson and Gerrard (1999) provided player-level evidence of market efficiency in the setting of soccer transfer fees. In addition, there have been numerous studies of coaching/managerial efficiency in soccer (e.g. Haas, 2003; Barros and Leach, 2006; Moura, 2016). But there remains no direct evidence on informational efficiency in the players’ labour market in European pro soccer. So we do not know, for example, if player wages in soccer reflect the marginal points value of attacking and defensive play which Anderson and Sally (2013) summarise as “0 > 1” since they found that the marginal value of not conceding a goal is much higher than the marginal value of scoring one goal.

Theoretical Framework and Proposed Test for Inefficiency
The proposed simple team-level test for players' labour market efficiency is particularly directed at the invasion-territorial team sports such as the various codes of football, hockey, and basketball. In these sports teams require both attacking quality to score and defensive quality to prevent scores by the opposition. The basic hypothesis is that if the players’ labour markets in these sports are efficient then the relative marginal performance value of attacking and defensive play in terms of team performance should be reflected in the relative marginal wage costs of attacking and defensive playing skills. Hence the proposed team-level test of market efficiency is estimate the marginal performance values and marginal wage costs of attacking and defensive play and investigate whether the relative marginal wage costs are consistent with the relative marginal performance values.

Data and Methods
The empirical context used to investigate the possibilities of inefficiency in the soccer players' labour market is the EPL, the leading domestic soccer league in England and the biggest soccer league globally in revenue size. The initial data set consists of annual team-level data covering 13 seasons, 1995/96 – 2007/08, with 20 teams competing each
season (sample size = 260). Due to promotion and relegation, 38 teams appeared in the EPL over the sample period. Performance is measured by league points (3 points for a win, 1 point for a draw, 0 points for a loss). Attacking and defensive quality are measured by goals scored and goals conceded, respectively. Wage costs are sourced from the audited annual company accounts of the soccer teams and adjusted pro rata if the reporting period has varied from 12 months. For teams undergoing bankruptcy proceedings during the sample period, wage costs have been sourced from the financial statements published by the court-appointed administrators. Although wage costs include coaches, support staff and those employed in the business, the dominant component is player wage costs and it is widely accepted that total wage costs provide a good proxy for player wage costs (e.g. Szymanski and Smith, 1997). All wage costs are standardised in real terms using a mean adjustment to remove the effects of annual wage inflation with 1995/96 used as the base year. Two basic regression models are estimated: (i) a wage model in which wage costs are modelled as a linear function of goals scored and goals conceded; and (2) a league performance model in which league points are modelled as a linear function of goals scored and goals conceded.

Initial Results and Discussion
1. The estimated wage model for the whole sample period yields marginal wage costs of £154.8k for goals scored and £143.1k for goals conceded. Statistically the equality hypothesis cannot be rejected. In other words over the whole sample period there is no evidence of teams paying a premium for either attacking or defensive quality.
2. The estimated league performance model for the whole sample gives estimates of the marginal performance value of goals scored and goals conceded as 0.780 points and 0.513 points, respectively. The equality hypothesis is rejected at the 1% level. There is very strong evidence that attacking quality has had a greater impact on league performance than defensive quality.
3. Given the divergent results for the estimated wage and league performance models, it is concluded that there is strong evidence of inefficiency in the EPL soccer players’ labour market over the period 1995/96 – 2007/08.
4. However there is considerable season-to-season variation in the estimated wage model with four seasons in which defensive quality had no significant relationship with wage costs.
5. There is some evidence of an upward trend in the relative importance of attacking quality on league performance particularly in the final two seasons. However, perversely defensive quality became a stronger influence on wage costs, implying greater inefficiency in the players’ labour market.

Further Work
The next stage of the research is to extend the dataset to include seasons 2009 – 2016 to determine whether or not there is still evidence of labour market inefficiency with the relative marginal wage costs of attacking and defensive playing skills out of line with their relative marginal values in league performance.