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Abstract

This paper analyses the impact of point systems on the degree of competition in professional football leagues via the annual coefficient of variation (CV) of end-of-season points.

The past, existing and some alternative point systems were applied to a hypothetical football league consisting of eighteen teams to find out changes in the CV value, which is assumed to measure the degree of football competition statistically.

On the basis of the computed CV values, it appears that the most competitive football league takes place statistically in which winner gets three, loser one and draws two points.

Key Words: economics of professional team sports, outcome of uncertainty, professional football leagues, degree of competition, coefficient of variation.

JEL Classifications: C40, D40, D81, L83.

I.Introduction

This paper seeks for a statistical rationale for the introduction of a new point system into a professional football league and it argues that the current point system applied in professional football leagues do not have a statistical rationale that consistent with the aims of football industry.

As far as this paper is concerned, the existing literature on professional team sports has not yet explored this issue explicitly.

Literature on the economics of professional team sports has been expanding rapidly since the pioneering study of Simon Rottenberg's paper in 1956. Cairns *et al*. (1986) and Downward & Dawson (2000) provide extensive surveys on different aspects of professional team sports. Currently, the following issues have been prevalent; the objectives of professional teams, the product market, the structure of leagues, team quality, uncertainty of outcome, demand for professional team sports, the labour market for players and so on.

Within the professional team sports, demand for professional football appears to have received more academic interest than any other professional team sports which is a reasonable point regarding its worldwide popularity. A few studies have attempted to establish a general theory of professional team sports such as Neale (1964), Jones (1969), and Vrooman (1995). As far as the economics of professional football is concerned more direct approaches on the economic issues relating the football industry were put forward by Sloane (1971) and Wiseman (1977).

Empirical studies on the economics of professional team sports focus, by and large, on the estimation of the demand for the attendance at the sport matches. Consequently, quantitative techniques are in widespread use. See Cairns *et al*. (1986) and Cairns (1990) for detailed surveys.

There have also been repeated attempts to measure the hypothesis of uncertainty of outcome in professional football matches, which is regarded as one of the major factor in determining attendance at professional team sports. Downward & Dawson (2000) carry out the most up-dated survey on this issue. It is assumed that uncertainty of outcome is directly related to the degree of competition in professional team sports. Thus, if the level of competition increases uncertainty of outcome increases too and it should result in an increase in the quality of matches and demand for professional team sports. Accordingly, this paper argues that introduction of the proposed new point system to professional football leagues might have a positive impact on the level of competition and hence demand for football since the proposed point in this study system statistically provides a higher degree of competition.

This paper is divided into five sections. Section II reviews literature briefly on the relation between the uncertainty of outcome and the degree of competition in professional team sports. Section III presents a simple statistical method aiming at the measurement of the degree of football competition with the intention of determining uncertainty of outcomes. Section IV provides a simple statistical rationale for applying different point systems to professional football leagues followed by the concluding remarks, Section V.

II.A Brief Literature Review of Uncertainty of Outcome and Degree of Competition

Existing literature on professional team sports emphasizes substantially the importance of the concept of uncertainty of outcome and relates it to the degree of competition. It is suggested that as the degree of competition rises uncertainty of outcome rise too, which should result in an increase in demand for professional team sports. It was argued that "the closer the competition within a league and the longer the challengers are in competition for the championship, the larger will be attendance" (Rottenberg, 1956, p.216). Moreover, the fundamental relationship between the gate receipts and the degree of uncertainty of outcome in professional team sports were analysed statistically and was pointed out that the gate receipts depend crucially on uncertainty of outcome of the games played within the league. And as "the probability of either team winning approaches one, gate receipts fall substantially" (El-Hodiri & Quirk 1971, p.1306). The concept of uncertainty of outcome in football were implicitly defined in two broad terms; the first one refers to the short-run uncertainty, which is based on the concept of "competitive balance" within a season and increases the demand for football. Whereas the long-run uncertainty refers the extent of domination over time of the number of league championship competitors by one or a few clubs which reduces interest of spectators substantially (Sloane, 1971, pp.124-128). On this issue another study proposed a short-run modelling of the concept of uncertainty of outcome via individual team's statistical match records, which concluded that "it had a significant impact on attendance in certain matches but less important as a determinant of aggregate attendance". This study also

concluded that the "potential for generating attendance through increasing uncertainty of outcome was relatively small" (Jennet, 1984, pp.181-817). Similarly, another study argued that "any attempt to produce closer competition to increase match uncertainty of outcome with the intention of increasing gate attendance may be undesirable from the perspectives of individual clubs; supporters apparently like to watch high-placed teams particularly when their own team is likely to win" (Peel & Thomas, 1988, p.248). Nevertheless, this same study also stressed that there should be an appropriate variable to measure uncertainty of outcome in order to present the competitiveness of a football league. The quantitative shortcomings of the existing studies on the importance of uncertainty of outcome and failures to capture all the dimensions of the uncertainty of outcome were put forward by Cairns, *et al*. (1986, pp.17-21). There is a general tendency that uncertainty of outcome is measured through econometric techniques. See Jennet (1984), Cairns, *et al*. (1986), Cairns (1990), Peel & Thomas (1988), Baimbridge *et al*. (1996). Whilst, Karacan (1967) suggested a simple statistical method for the degree of competition in a football league which was also used as an appropriate proxy for the concept of uncertainty of outcome. Karacan (1967) argued that annual " coefficient of variation" (CV) of end-of-season points could be used as the sole explanatory variable to determine the competitiveness of a football league. According to Karacan (1967), dispersion of the final standing points of a football league is a direct result of the competitiveness that takes place between the football teams in that particular season. Since the competition rules remain the same, by and large, in every season. Thus, the annual CV values are appropriate proxies to make

comparisons between consecutive seasons (Karacan, 1967, 83). Cairns (1987) and Halicioglu (1998) also used the annual CV values of end-of-season points to measure the degree of competition in professional football leagues.

III.A Simple Statistical Method for Competiteveness

According to Karacan (1967), justification and usefulness of the annual CV values of end-of-season points to measure the degree of competition in a football league as is as follows; if there is N team in a league, the number of total matches and total points are constant providing that all matches are played and no point is deducted. Moreover, since football teams in a league within a season play normally two matches with each other. For a win, the winner gets two points; the loser gets nil; and one point is awarded to each team in the case of a draw.

Consequently, the closer the teams` final standing points to the league average point ($\bar{X}$) the higher the competitiveness. As the level of competition increases, the probability of draws increases too, which indicates that the strengths of the teams are getting very close to each other. Furthermore, as standard deviation of the total points (s) is influenced by the variations in every point, it is also an appropriate proxy to determine the level of competition. Nevertheless, it is a very common practice to change the size of a football league from one season to another for some reasons. Thus, if N is not constant, standard deviation of end-of-season points allows us to determine just one particular seasons' competitiveness. In order to compare the level of competitiveness between the different seasons, we need a more general proxy variable. Karacan (1967) suggested using the annual coefficient

of variation (CV) of end-of-season points. Since each team has got an equal chance to win the contest at the beginning of season, which also implies that the dispersion of total points has a normal distribution. Thus, the annual CV value of end-of-season points from this dispersion ranges between 0 and 1, which is evaluated as the upper and lower degrees of competition. The upper and lower values of the CV are calculated and evaluated as follows;

In the first extreme case, it is assumed that there is literally no competition between the teams. In other words, N teams are differentiated from each other by their absolute strength and are ranked from 1 to N accordingly. This assumption implies that there is no uncertainty of outcome and all other factors affecting the degree of competition remain constant. Thus, at the end of a season, the champion team would have won all its matches. Obviously, this extreme league does not allow any chance for a draw either. The runner-up would have beaten all the other teams in the league except for the champion. The other teams in the league would be ranked accordingly. For example, the team at the bottom of the strength rank would have not won any matches in this particular season.

The first extreme case produces a maximum annual CV value of end-of-season points according to the value of N, which indicates no competition at all between the football teams and perfect certainty of outcome for each football match.

In the second extreme case, the annual value of CV regardless of the value of N, which equals to zero, This situation occurs, if all football teams in a league would have exactly the same strength. Thus, each team either finishes all of its matches with a draw or will have equal wins and losses. As a result, all the

teams would get exactly the same total points at the end of this particular season. It is clear that this second extreme case represents a perfect competition situation between the teams of a league. Therefore, uncertainty of outcome will be at the highest level.

In brief, as the CV value gets nearer to zero, the level of competition increases or vice versa (Karacan, 1967, pp.83-85).

IV. Rationale for the New Point System

Governing bodies of professional football industry set and implement the rules and regulations, which are binding for the industry. These rules and regulations should have appropriate rationales and should aim at increasing the degree of uncertainty of outcome and hence the demand for football in order to maximize the total revenue of the industry. Rules and regulations of the professional football industry appear to have remained fairly constant over hundred years. However, a major change in the point system of professional football leagues took place in the 1980s, which replaced the system of the two points for a win with the system of the three points for a win. The new point system of the three points for a win was introduced first time in the season of 1981-1982 in the English football leagues and was adopted gradually by the rest of the football world. According to one initial study " the rationale for the new point system was presumably that more reward for winning games would encourage more positive attitudes from teams and that the consequent more attractive and attacking football would bring in bigger crowds" (Newson, 1984, p.87). On the other hand, another study analysed the impact of the new point system of the three points for a win on the degree of competition over seven consecutive seasons through a small sample, which included nine European

top football divisions and revealed mix evidences for the introduction of the three points system for a win (Halicioglu, 1998, pp.190-192).

This raises the question of consistency between the rationale of the introduction of a new point system and the degree of competition in professional football leagues.

Considering the importance of uncertainty of outcome on the degree of competition in professional football industry, this paper proposes a new point system that at least statistically produces a higher degree of competition. For this proposition, this paper adopts the methodology of Karacan (1967) and assumes a hypothetical football league consisting of eighteen teams. We further assume that the other factors influencing the degree of competition remain constant. The table 1 below presents the computed maximum annual CV values of end-of-season points for the past, current and alternative point systems for this hypothetical football league.

In table 1, the *old point system* refers to a league in which the winner gets three points loser gets nil point and draws one point. The *current point system* is based on three points for a win, one point for a draw and nil for a loss. The *alternative point system 1* is based on three points for a win, two points for a draw and one point for a loss. The *alternative point system 2* refers to three points for a win, two points for a draw and nil for a loss. The *alternative point system 3* refers to four points for a win, two points for a draw and one point for a loss.

The table 1 shows that switching from the old system of the two points for a win to the three points for a win statistically makes no difference on the degree of competition since the annual CV values remains constant. In this

regard, we may tentatively argue that the policy strategy of football organizations have failed to acknowledge the statistical impact of the current system of the three points for a win on the degree of competition as far as the respective CV values of the past and current point systems are concerned.

The *alternative point system 1* that has been proposed here is statistically halves the value of the CV compared to the past and current point systems. From this perspective, it seems that the changes in the respective CV values are purely simple statistical calculations and do not suggest that there would be a proportional increase in the degree of competition. If, however, a new point system is to be introduced to football leagues, it should be the one representing a higher degree of competition at least statistically.

Labeled as *alternative point system1*, which is a new version of the three points for a win, might increase the actual level of competition. Even though we do not have any statistical evidence on the point strategy of football teams during a season, we could tentatively argue that rewarding a point for a loss might stimulate the weaker teams and decrease possible sharp point gaps between the stronger and weaker teams in the course of a season. Of course, it is possible to reverse this argument exactly in opposite direction. Similarly, it could be also asserted that rewarding two points for a draw might encourage possible collusion between the teams if they were in need of points desperately especially towards to the end of a season. However, the validity these of arguments are subject to the point strategy of individual football clubs, which remains to be seen under the implementation of the proposed point system. Other new point systems were considered in this study, labeled as *alternative point system 2* and *alternative point system 3* respectively, do

not perform better than the proposed point system in terms of their CV values.

Alternative point system 2 is another suggested point system that produces statistically the same degree of competition as the old and current point systems considering respective CV values. Whereas *alternative point system 3* could be regarded as the second best choice since it has the second lowest CV value.

It is possible to expand this list of alternative point systems. For example, one might argue that away wins should be rewarded more points than home wins or the draws with goals should have more points than the one without goals. Nevertheless, there is no clear-cut empirical evidence that high degree of football competition might be confined to just a number of goals, home or away wins. Since from an impartial view of spectators, the quality of matches with or without goals could be more exciting as well. In this sense, each football match should be judged separately on its merits. In real life, it is also a well-known fact that motivation, attitude and strategy of individual teams vary considerably from one match to another, which might affect the level of competition substantially.

Table 1: A Brief Comparison of Different Point Systems

Point Systems	s	$\bar{X}$	CV	N
The Old Point System	20.752	34	0.610	18
The Current Point System	31.128	51	0.610	18
Alternative Point System 1	20.752	68	0.305	18
Alternative Point System 2	31.128	51	0.610	18
Alternative Point System 3	31.128	85	0.366	18

V. Concluding Remarks

This paper has analysed a statistical rationale for the introduction of a new point system in professional football leagues with the intention of increasing outcome of uncertainty and hence the demand for football. It has argued that amongst the old, current and new point systems, which were selected arbitrarily for this study, a new version of the three points system for a win provides statistically a higher degree of competition as far as the respective annual CV values are concerned. Nevertheless, conclusions drawn from this analysis should be treated cautiously since a number of factors affecting the degree of competition such as income levels, management skills, point and match strategies of individual teams, quality of players, league structure, crowd, and so on could not be incorporated in this study. Consequently, these hypothetical statistical comparisons may not be significant until the actual competitions taking place under the proposed point systems over a few seasons. And finally attitudes of teams for competitive matches could be independent of any point systems.

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