

## CAN WE PREDICT THE OUTCOME OF THE INTERNATIONAL FOOTBALL TOURNAMENTS? : THE CASE OF EURO 2000

### ULUSLARARASI FUTBOL TURNUVALARININ SONUÇLARI TAHMİN EDİLEBİLİR Mİ? EURO 2000 ÖRNEĞİ

**Ferda HALICIOĞLU**

*The University of Greenwich, Department of Economics*

**ABSTRACT** : This paper statistically analyses and attempts to predict the most likely winners of the Euro 2000 football tournament on the basis of the seasonal coefficients of variation (CVs) of the end-of-season points, which were computed from the top division final standings of participating countries of Euro 2000.

The CV values computed from over ten seasons for the respective countries were used as a sole measurement value to rank the countries and to determine the most likely winners of Euro 2000.

According to the three scenarios (long-term, mid-term, and short-term) based on the respective CV values of fifteen countries, France appeared to be the most likely country to win Euro 2000 and was closely followed by Spain.

**Keywords:** Football, Ranking, UEFA, Sports forecasts.

**ÖZET:** Bu çalışma Euro 2000 futbol turnuvasını hangi finalist ülkenin kazanabileceğini istatistiksel olarak analiz etmeyi amaçlamaktadır. Euro 2000 futbol turnuvasına katılan finalist ülkelerin birinci liglerinde oluşan yıl sonu puan tablolarından hesaplanan değişim katsayısı (DK) bu öngörü için kullanılmıştır.

Euro 2000 futbol turnuvası öncesi her finalist ülke için hesaplanan son on yılın DK değerleri, finalistlerin futboldaki rekabetçiliklerini sıralamada ve Euro 2000'ni kazanmalarında tek belirleyici değişken olarak kullanılmıştır.

On beş finalist ülke için hesaplanan uzun, orta ve kısa dönem DK değerlerinden oluşturulan senaryolara göre Euro 2000'ni Fransa'nın kazanmasının en muhtemel olduğu ve İspanya'nın ise diğer bir güçlü aday olduğu öngörülmüştür.

**Anahtar Kelimeler:** Futbol, Sıralama, UEFA, Spor Öngörülleri

### 1. Introduction

According to the European Commission estimates, the sports-related activities now account for 3% of world trade but as argued in Szymanski (2001), sports economics is a comparatively under-researched field. The existing literature in sports economics is largely based on the issues related to the demand for sports, transfers market, market structure, broadcasting revenues, etc. For comprehensive discussions of these

issues and different aspects of ever growing literature of the professional team sports, see for example, Zimbalist (2001), Downward and Alistair (2002), Borland and Macdonald (2003), and Sandy *et al.* (2004). It seems that there have been significant differences in empirical research of sports studies, especially between the USA and European economists, which are related to differences in the structure and organization of the sporting leagues in these continents. Another important aspect of these empirical studies is that they are either single country or club based. There seems to be hardly any cross-country evidence on any aspect of professional team sports, especially in the field of predicting the outcome of international sports.

Football is considered to be the most popular sport in the world and its' world governing body, FIFA (Federation Internationale de Football Association) has more than 200 member countries, with more than two hundred million active players.

This paper aims at contributing to the existing sports literature in terms of providing statistical evidence on the degree of football competition and uses the ranking system in order to forecast the most likely winners of the international football tournaments in the case of Euro 2000. As far this paper is concerned, the forecasting of the outcome of the international football tournaments has not been explored previously.

Section 2 of this paper presents, briefly, different approaches to the outcome of uncertainty and competitive balance. Section 3 provides a simple statistical method that measures, partially, the degree of football competition in domestic football leagues. Section 4 presents the results of the degree of domestic football competition, based on the coefficient of variation for participating countries of the Euro 2000 tournament, followed by the concluding remarks, section 5.

## **2. The Uncertainty of Outcome and the Competitive Balance in Professional Team Sports**

The existing literature on professional team sports, by and large, analyses the concept of the uncertainty of outcome in terms of demand for professional team sports and hence increasing the "gate" revenues. For example, Rottenberg (1956) argued that the tighter the competition, the larger the attendance. Similarly Jones (1969) pointed out that the degree of competition could be measured by the degree of uncertainty over the outcome of the game so that the greater the uncertainty, the larger the gate. In a similar approach, El-Hodiri and Quirk (1971) suggested that demand for the professional team sports depends crucially on the uncertainty of the outcome of the games played within the league and as the probability of either team winning approaches one, gate receipts fall substantially. Whereas, Sloane (1971) emphasised that the quality of the game, as well as the uncertainty of outcome, creates interest. Sloane (1971) also identified implicitly the concept of the short and long run uncertainties in the football leagues. The former concept refers to "competitive balance" between the teams within a season that increases attendances, the latter concept refers to the extent of domination over time of the number of league championship competitors by one or a few clubs which reduces spectators' interest substantially. Wiseman (1977) has also suggested that it is in each team's interest to prevent a great disparity between their playing strengths. Each game's attractiveness depends to a large extent on the expectation of a close match. One-

sided games are not likely to be as attractive as those offering a close game, with odds slightly in favour of the home side.

On the other hand, Jennet (1984) argued that the uncertainty of outcome is a significant determinant of attendances in certain matches but less important as a determinant of aggregate attendances. Similarly, Peel and Thomas (1988) discussed that any attempt to produce closer competition to increase match uncertainty of outcome with the intention of increasing gate attendances may be undesirable from the perspective of individual clubs, as supporters apparently like to watch high-placed teams particularly when their team is likely to win.

To a certain extent, the division, in terms of how to relate the concept outcome of certainty to demand for sport, lies in the fact that the structure and organization of professional sporting leagues are rather different especially between the USA and Europe. Hoehn and Szymaniski (2000) outlines the two main differences. Firstly, the USA leagues are generally “hermetic”. It implies that new teams are seldom admitted to a league, and there is no annual promotion and relegations between the separate divisions. The teams in the USA leagues are also closed to foreign competitions and therefore they do not compete simultaneously in different international competitions. In contrast, the European leagues are open to seasonal promotion and relegation. The clubs in Europe also compete at different international games, in addition to the different domestic competitions. Therefore, the US sporting league structure appears to be relatively less competitive. Secondly, US authorities have attempted to maintain a competitive balance between the teams via intervention in the labour market or redistribution of club teams. The main channel of income distribution tool in the USA sporting organization is the national broadcast revenues, which was put in effect in 1962, and typically, these revenues are equally shared by the clubs. In comparison, most European clubs started to accrue broadcasting revenues in the early 1990s, and these revenues are generally distributed on the base of a performance-related and a fixed share. See also different aspects and evaluations of sporting leagues in the USA and Europe in Fort (2000), Syzmanski (2001a), and Forrest *et al.* (2002). Therefore, Downward and Dawson (2000) argued that, given the long-run domination in the professional football leagues as an acceptable form of competition, revenue equalizing would not improve the competitive balance in European team sports.

Forrest and Simmons (p. 299, 2002a), clears the common misconception in the literature on the economics of sports league in North America and Europe as follows: “competitive balance” refers to a league structure that has relatively equal playing strength between league members, whereas “uncertainty of outcome” is related to a situation where a given contest within a league structure has a degree of unpredictability about the result and, by extension, that the competition, as a whole does not have a predetermined winner at the outset of the competition.

### **3. Measurement of the Uncertainty of Outcome in Professional Team Sports**

As argued in Cairns *et al.* (1990), closer contests attract more spectators. Three forms of outcome of uncertainty are distinguished: uncertainty of match outcome, uncertainty of seasonal outcome, and the absence of long run domination. The

existing literature on professional team sports especially in professional football leagues does not offer a clear-cut measurement for the concept of uncertainty of outcome due to its nature. The concept of the uncertainty of outcome in professional team sports may be a function of several quantitative and qualitative factors, such as the number of matches played at home and away, wins, losses, draws, the forms of individual players, motivation, experience, pitch and weather conditions, crowd, referee decisions, chances and so on. As Cairns *et al.* (1986) pointed out, uncertainty of outcome has a number of dimensions and in general, the uncertainty of match outcome hypothesis has not been tested adequately. However, a substantial number of studies have tried to formulate a suitable proxy variable to measure different forms of uncertainty in professional team sports. These studies, by and large, use the developed proxy variable of uncertainty in order to analyse its impact on either gates revenues or the demand for professional team sports. Within these studies, for example, Cairns (1988), Peel and Thomas (1996), Falter and Perignon (2000), Forrest and Simmons (2002b), Garcia and Rodriguez (2002), Price and Sen (2003) concentrate on match uncertainty and they test the hypothesis that uncertain matches will attract greater support. On the other hand, Demmert (1973), Noll (1974), Jennett (1984), Whitney (1988), Dobson and Goddard (1992), Baimbridge (1997), Szymanski (2001b), and Garcia and Rodriguez (2002) analyse the impact of seasonal uncertainty on the closeness of specific championship races and degree of match attendance. Finally, Schmidt and Berri (2001) and Humphreys (2002) research into the relationship between the long-term dominance and match attendance in professional team sports. The measurement of uncertainty in the sports empirical studies varies a great deal. To this end, researchers employ different proxy variables, such as absolute difference in league ranking, probability of home win, difference in average goals scored, estimated ratio of home team win to away team win, differences in league ranking, differences in games won in previous matches, average games behind leader, significance of match for championship and relegation, games behind leader, coefficient of variation of games won, relative intra-season uncertainty between championship and FA cup, and Gini coefficient on team winning percentage. A range of statistical and econometric models has utilized the variable of uncertainty of outcome. For detailed discussion of these proxy variables and main findings of these studies, see, for example Cairns *et al.* (1990), and Borland and Macdonald (2003). Borland and Macdonald (2003) discusses the fact that the variable of uncertainty of outcome seems to affect the demand but this literature focuses on the UK and USA, on sports such as soccer or baseball. For that reason, the generality of findings from demand studies must be regarded as somewhat questionable, despite the sophisticated treatment of uncertainty of outcome.

There also exist some studies which treat the standard deviation or coefficient of variation (CV) of end-of-season points which are employed as a statistical criterion to measure the degree of professional football competition. See, for example, Cairns (1987), Halicioglu (1998), and Koning (2000).

In terms of predicting the outcomes of professional team sports, there are few studies using the ranking system in professional sports such as Sauer *et al.* (1988), Camerer (1989), Brown and Sauer (1993), Dixon and Coles (1997), Bryan and Stekler (1999), and Lebovic and Sigelman (2001). However, the sport forecasting studies

concentrate on either individual sports, such as tennis, or they tend to predict the outcome of domestic league matches, rather than international football tournaments.

As for determining the variables influencing a country's performance in international football tournaments, Hoffmann *et al.* (2002) presents an econometric model but does not provide any forecasts from there. Similarly, some empirical studies aim at predicting the success performance at the Olympic games, which are not deemed as professional team sports. See, for example, Condon *et al.* (1999), and Bernard and Busse (2000),

This study adopts the seasonal CV approach, in order to measure the degree of football competition across the European football leagues and rank them accordingly, so that they provide a reasonable predictive power for the likely winner of the Euro 2000.

The seasonal CV values computed from the end-of-season points of a domestic football league could be very plausible proxies for prediction, as the 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 seasons. Since this approach assumes that each football team has got an equal chance of winning the contest at the beginning of a season, which implies that the dispersion of total points has a normal distribution, therefore seasonal CV values range between zero and unity, which are evaluated as the upper and lower boundaries of football competition, providing that all matches are played and no points are deducted. On using the seasonal CV values, one contemplates the two extreme situations: firstly, it is assumed that there is the case of a perfect competition situation, which implies that all the teams in a league have the exactly the same strength. Therefore, each team finishes all of its matches with a draw or will have equal wins and losses. As a result, the value of seasonal CV values will be zero regardless of the number of teams in a league. It is clear that this league will display the highest value of the outcome of uncertainty hence it is deemed to be the most competitive league. Secondly, there is the case of an imperfect situation where all the teams in a league are ranked according to their absolute strengths, at the end of a season, the champion team would have won all its matches, the runner-up would have beaten all the other teams in the league except for the champion, and so on. For example, the team at the bottom of the league at the end of a season would have not won any match. Obviously, this extreme league produces a maximum seasonal CV value depending on the number of teams in a league, which also implies the perfect certainty of outcome of matches.

Considering the competition implications of the seasonal CV values, this paper argues that there is a strong positive correlation between the degree of domestic football competition and success at international football tournaments. The main reason for this proposition is that the national squads are mainly derived from the domestic football teams, especially from the top division teams. Of course, some members of the national squads or all of them could be playing abroad at the time or before they are selected for the national squad. It is assumed that those national football players who are selected for the national squad have already experienced some degree of domestic football competition. Thus, a national squad whose players have experience of a high degree of football competition at domestic level will have

an advantage over those nations which have a relatively less competitive league. This point implies that the countries with a high degree of domestic football competition, i.e., with the lowest CV value, will have the highest possibility of winning international football tournaments, providing that the other factors which influence the performance of success are constant for all the teams.

#### 4. Estimation and Prediction

The European nations' football tournament is held every four years and is organized by the United European Football Association (UEFA), which is the governing body of fifty-one European football associations. The so-called Euro 2000 tournament took place in the joint host countries of Belgium and Holland in June 2000. The fourteen finalists of this tournament came through a two-tier elimination over a four years period. At the elimination stages of June 2000, the four groups consisting of four countries were formed. They were as follows: group A: Germany, Romania, Portugal, England; group B: Belgium, Sweden, Italy, Turkey; group C: Spain, Yugoslavia, Slovenia, Norway; and group D: France, Denmark, Holland, and Czech Republic. The matches were played on the basis of a single tier. Two teams from each group were allowed to go the quarterfinals, which were Romania, Portugal, Turkey, Italy, Spain, Slovenia, France and Holland. Then four teams reached the semi-finals, which were Italy, Spain, France, and Holland. Then, the final game was played between France and Italy, in which France won.

According to the bookmakers and football experts, the initial favorites of this tournament were France, Germany, Spain, Italy, and Holland. The bookmakers, by and large, use quantitative techniques for predictions, which are based on the number of international wins, losses, goals, etc, whereas the football experts prefer to use more judgemental methods such as the forms of individual players, the management, motivation, the match strategy, experience, crowd and pitch conditions, and so on.

The estimation process and methodology of this study is summarized as follows; the annual CV values of end-of season points for the finalists of the Euro 2000 were computed from the respective countries' top division football leagues on the basis of the two points for a win, one point for a win and nil for a loss, between the seasons 1990/1991 and 1999/2000.

It should be noted that some finalist countries, for example, Italy, Sweden and Spain were applying initially the two points for a win, one point for a draw and nil for a loss, then they switched to the system of three points for a win, one point for a draw and nil for a loss, at some different stages of this estimation period whilst some countries such as England, Turkey were already in the system of three points for a win, one point for a draw and nil for a loss. Seasonal CV values for Yugoslavia, however, were not computed as this country used a rather strange point system. In Yugoslavia, drawn matches result in penalty shoot-outs, the winners receiving a point during the estimation period. See the Rothmans Football Year Book edition 23 for detailed information.

Table 1 presents the annual CV values for the finalist countries. The countries were ranked according to descending CV values, which indicate the relative strength. On

the basis of annual CV values, three scenarios were formed. The first scenario labelled as the long-term, which is based on a ten-year average of the annual CV values between the seasons 1991-2000. It was assumed that if there were an underlying trend in the level of domestic football competition, the long-term CV values would be more reliable for prediction. Similarly, a five-year average of the annual CV values was calculated to see the fluctuations in the degree of football competition between the seasons of 1996-2000, as a mid-term option. Finally, the football season of 1999-2000 CV values were computed, with the intention of comparing finalists countries in a very short period. These scenarios aim at capturing the impact of the underlying trend and competitiveness in domestic football leagues over the estimation period, which is deemed to be useful for prediction purposes. There is no statistical evidence that either scenario was preferred to any other. However, it is possible to point out, tentatively, that considering the ever-changing nature of football teams, short-term to mid-term scenarios should provide relatively more reliable predictions.

**Table 1. The Prediction of the Likely Winners of Euro 2000 via the Respective CV Values**

Rank	Countries	CV*	Countries	CV**	Countries	CV***	Countries	FIFA Ranking
1	France	0.212	France	0.206	France	0.148	Czech R.	2
2	Spain	0.219	Spain	0.214	Spain	0.160	France	3
3	England	0.222	England	0.223	Denmark	0.164	Spain	4
4	Germany	0.226	Germany	0.224	Sweden	0.178	Germany	6
5	Sweden	0.241	Sweden	0.235	Germany	0.244	Norway	8
6	Italy	0.257	Italy	0.242	Belgium	0.262	Romania	10
7	Romania	0.258	Denmark	0.252	Portugal	0.262	Yugoslavia	11
8	Denmark	0.268	Belgium	0.269	England	0.268	England	12
9	Czech R.	0.278	Czech R.	0.272	Italy	0.277	Denmark	13
10	Belgium	0.280	Romania	0.281	Romania	0.293	Italy	14
11	Norway	0.282	Slovenia	0.282	Turkey	0.298	Portugal	15
12	Portugal	0.284	Portugal	0.285	Holland	0.327	Sweden	16
13	Slovenia	0.292	Norway	0.295	Czech R.	0.340	Holland	21
14	Holland	0.303	Turkey	0.302	Slovenia	0.347	Belgium	30
15	Turkey	0.306	Holland	0.309	Norway	0.354	Turkey	34
16	Yugoslavia	N/A	Yugoslavia	N/A	Yugoslavia	N/A	Slovenia	45

Notes:

i. Slovenia's long-term annual CV value was based on the last eight seasons, as this country became independent in 1991.

ii. The FIFA world ranking was as of 10 May 2000, see [www.fifa.com](http://www.fifa.com).

iii. \*, \*\*, \*\*\* refer to long-term, mid-term, and short-term CV values, respectively.

iv. The end-of-season points were obtained from Rothmans Football Year Book, editions 21-31.

It is obvious that the nature of football is very volatile and the success in international football tournaments may depend on several measurable and non-measurable factors, such as the form of players, motivation, management, referee decisions, chances, experience, pitch and weather conditions, spectators' support, being host country, and so on. Nevertheless, apart from the annual CV values, all the above-mentioned factors were initially assumed to be constant for all the finalist countries.

As seen from Table 1, it is clear that the French domestic football league is the most competitive in terms of the three scenarios outlined above. Hence, it is argued that this country would be the most likely country to win Euro 2000, which, in fact, was

the outcome of this tournament. Table 1 also indicates that the other most likely countries to win Euro 2000 would be initially Spain, followed by England, Germany, Sweden and Italy. It is a possible situation that some of these favorite countries might be in the same elimination groups and due to the team restrictions could not go through the quarter or semi-finals. Nevertheless, it would be still expected that one of those statistically favourite country who made the quarter and semi-finals could achieve the championship eventually.

The Euro 2000 winner, France, which also won the last world cup in 1998, seems to have a very competitive domestic football competition, on average, and the degree of football competition appears to be increasing further more in the recent years. In fact, its annual CV value was very close to zero in the last season of the estimation period. The same underlying trend was also true for the Spanish league. On the other hand, German, Italian (runner up), English, and Swedish leagues appeared to have relatively stable domestic football competition at home in comparison to the French and Spanish leagues. There were the other nations in the tournament, which made unprecedented successes by achieving the quarter and semi-finals. For instance, Turkey and Slovenia, who qualified for the quarterfinals, have relatively very high CV values. Similarly, Portugal and Holland, who reached the semi-finals also, have relatively high CV values too.

The CV ranking method in this study was also compared to the Federation of International Football Associations (FIFA)/Coca-Cola World Ranking, which is possibly the best ranking in international competitive football, is displayed in the last column of the Table 1. From 1992, FIFA has been ranking 202 member countries according to all international "A" level matches.

The FIFA ranking list is drawn up on the basis of wins, draws, losses, the number of goals, importance of the match, strength of the opponent, regional strength, etc., which is updated every month. For a detailed calculation methodology and history of this ranking, see the official web site of FIFA's world ranking at [www.fifa2.com](http://www.fifa2.com). The last FIFA ranking for the Euro 2000 finalists as of May 2000 is displayed in Table 1. The FIFA rank value of 2 indicates the actual standing of the Czech Republic out of 202 member countries. According to the FIFA ranking, it seemed that the Czech Republic was the most successful football country at that time amongst the Euro 2000 finalists. If it was relied on the FIFA ranking, then France, Spain, and Germany would be also the strongest favourite countries to win the Euro 2000 contest. Interestingly, there are some striking similarities between the FIFA ranking and the ranking that is suggested in this study, even though the methodologies are completely different. For example, France, Spain, and Germany appear to be the strongest teams in both rankings, which were also initially amongst the favorites for the Euro 2000 football championship. Similarly, Holland, which was one of the favorite countries initially, did not appear as such in both rankings. There, however, are also a few differences between these two ranking systems. For example, in the FIFA ranking, the Czech Republic was the most successful in international matches but could not reach even the quarterfinals of Euro 2000. Nevertheless, the FIFA ranking still confirms the proposition of this study to a certain extent, which states that the higher the domestic level of competition, the higher the level of success in international football matches.

## 5. Concluding Remarks

This study has presented a simple but relatively powerful statistical method that might be helpful to predict the likely winners of an international football tournament. The prediction methodology is based on the ranking of the countries according to the respective seasonal coefficient of the variation of end-of-season points calculated from the domestic football leagues. It is suggested that the seasonal coefficients of variation of end-of season points are reasonably good predictors for the outcome of uncertainty and hence for the competitiveness of a domestic football competition. And those countries with the high degree of domestic football competition are more likely to achieve international success.

This study has also presented a statistical evidence that the prediction of the outcome of international football tournaments with the CV method is more accurate than the FIFA ranking, even though the latter method is more sophisticated than the method adopted here. It should, however, be noted that these predictions are partial representations of the actual outcome. Thus, the results should be treated cautiously. Given the nature of football, one cannot make perfect predictions for any football tournament. Moreover, there are still several problems associated with any measurement of uncertainty of outcome in professional team sports.

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