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# Foreign players and competitive balance in Greek basketball and handball championships

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### ABSTRACT

One of the key issues of team sport championships is competitive balance. One of the dimensions of competitive balance is concerned with the differences in sporting capabilities of teams within a season. The aim of this study is to evaluate competitive balance in Greek basketball and handball championships in relation to the presence and number of foreign players. The examined periods are from 1965–1966 to 2012–2013 ( $n = 47$ ) for basketball and from 1983–1984 to 2012–2013 ( $n = 30$ ) for handball. Foreign players appeared in basketball starting from 1988 while in handball from 1999. For each season and sport, two global and three special indices that capture competitive balance in the multileveled championship structure were calculated. Results showed that the number of foreign players per team is dependent on the country's macroeconomic status and in its turn improves the overall competitiveness, as well as competitiveness at the relegation level. In handball foreign players appeared later and in lesser numbers than in basketball. The increase in competitiveness of the national basketball league as a result of the increase in numbers of foreign players across all teams was followed by an upsurge in the quality, performance and achievements of the top teams participating in the European competitions.

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## 1. Introduction

Sport holds a prominent place in the social life of people. A person may actively partake in a sport but he could also take on the role of an audience. In one way or another sport not only becomes part of the culture of a nation, it is also a potentially significant economic event. Team sports are high in preference and popularity and are the centre of attention. Fans are intrigued with a match when there is uncertainty of result. To be able to ensure uncertainty of the result between teams in a league, it would be desirable to have teams with equal chances of winning the match.

In Greece, team sports are undoubtedly the most popular. Basketball and handball are two team games that we discuss in this paper. Although both are team sports, they exhibit fundamental differences. Basketball appeared in Greece toward the end of the 1910s. The first championships took place in the 1927–1928 season divided between the north and south of the

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country, while the first national championship took place in the 1960s. An important structural change took effect in 1992 with the formation of the first professional league or the First League. However, even though players were not officially “professionals” before this date, they enjoyed considerable incomes or other perks.

On the other hand, handball in Greece officially started in 1979. It is a relatively newer sport than basketball. Handball is divided into one national league and several local leagues based on geographical criteria. Leagues in both sports are considered open, based on the promotion–relegation rule; that is, the last teams on the ladder are replaced the following season by the best teams of the immediate lower league. Even today, handball continues to be termed amateur as it has not been officially termed professional by the state even though in the beginning of the new millennia there was a tendency for higher wages and an introduction of more foreign players. Basketball has a longer presence than handball and is more popular as well as gaining good rankings in European basketball and world placements. In the beginning, participation in both sports was limited only to Greek players. Foreign players appeared in basketball and in handball in the 1988–1989 and 1999–2000 seasons, respectively.

Competitive balance has arisen as the basic requirement and target of championships in team sports and has been the highlight of many research studies (Groot, 2008; Humphreys, 2002; Michie & Oughton, 2004; Szymanski, 2001; Szymanski, 2003; Vrooman, 2009; Zimbalist, 2002). An early article by Rottenberg (1956) lays the approach for discussion on competitive balance among researchers. Rottenberg states that for a championship to be successful, it is essential that the teams are of relatively equal strength. This approach differs from conventional business ventures where a supplier of a product can “in effect” become the market leader and may force other competitors out of the market. In professional team competitions, the product is dependent on both teams. The basic fundamental of sports is that competing teams must act as a “symbiotic contest between evenly matched opponents” (Vrooman, 2009, p. 5). On the same ground, Quirk and Fort (1997) refer to the fact that if contestants are of relatively equal strength, this ensures interest in the competition. Similarly, Fort and Quirk (1995) support the necessity of competitive balance in order to uphold fan interest and thus revenue for the particular team and the league as a whole.

Kringstad and Gerrard (2004, 2005, 2007) put forward the idea of competitive intensity, which is in some way an extension of competitive balance as it deals with sporting prizes associated with the final ranking list of a team. While Kringstad and Gerrard (2004, 2005, 2007) do not test the impact of competitive intensity on fans’ demand, Andreff and Scelles (2014) and Scelles, Durand, Bonnal, Goyeau, and Andreff (2013a), Scelles, Durand, Bonnal, Goyeau, and Andreff (2013b) find a significant positive impact on competitive intensity on attendance in the French football Ligue 1.

### 1.1. Literature review

As outlined by Fort and Maxcy (2003), two distinct lines dominate competitive balance; the analysis of competitive balance (ACB) related to “business practices of pro sports leagues” (p. 155) and the uncertainty of outcome hypothesis (UOH) related to fans. An important methodological issue is the quantification of competitive balance that is a multifaceted parameter (Zimbalist, 2003). Over the years, numerous indices have been utilized to measure competitive balance in its static or dynamic aspect (Groot, 2008). A widespread index used is the standard deviation of winning percentage (Quirk & Fort, 1997; Scully, 1989). The Gini coefficient is another means of measuring within season competitive balance, which has been employed by various researchers (Schmidt, 2001; Schmidt & Berri, 2001; Utt & Fort, 2002). The concentration ratio is a frequently used index which measures the degree of domination (Depken, 1999). Goossens (2006) employs the National Measure of Seasonal Imbalance (NAMS) that is an adapted and developed version of the ratio of standard deviation. However, those indices do not take into account the three-leveled structure of European championships; the first level being the championship title, the second level involving the top remaining teams participating in European competitions, and the third level including the bottom teams that are relegated to a lower division. For this reason, a number of specially designed indices developed by Manasis, Avgerinou, Ntzoufras, and Reade (2013) that capture this complex structure are employed for the analysis of competitive balance.

A main research interest is the analysis of competitive balance (ACB) over time or as the outcome of parameters such as changes to business practices or rules and regulations directly connected to league structure (Fort & Maxcy, 2003). Balfour and Porter (1991) and Scully (1989) studied the effect of the free agency rule in Major League Baseball (MLB), while Schmidt (2001) studied the increase in the number of teams participating in the League. Eckard (2001) provides an insight into the economics of MLB with respect to market size and winning with reference to the Baseball Blue Ribbon Economic Report. Maxcy (2002) studied the mobility of players concerning draft rules and free agency whereas Fort and Quirk (1995) analyzed the financial incentives and outcomes in the management of professional team sports leagues.

Research concerning European sports leagues has been carried out by a number of researchers. Dobson, Goddard, and Ramlogan (2001) studied the convergence hypothesis using annual gate revenue in the English Premier League for the period between 1926 and 1997. No convergence was found when taking the period as a whole but there was evidence of convergence for specific sub-periods. Martinez-Santos, Enjuanes, Cruz, Pino, and Crespo (2009) studied the Spanish Basketball League with reference to different tournament designs. Addesa (2011) carried out a study concerning competitive balance in the Italian basketball championship in relation to structural changes concerning the recruitment of foreign and national players. It concluded that the key factor for competitive balance was not the number of foreign players in the various sub-periods but the quality of players. In another study, Sima and Prochazka (2011) compared competitive balance evolution in the Dutch and Czech Football Leagues between 1970 and 2010. The results showed that competitive balance in the Dutch

League was relatively steady at a high level compared to the Czech League which exhibited great irregularities over the observed period. [Koning \(2000\)](#) studied competitive balance in Dutch Soccer from 1956 to 1996. The results showed that while the balance decreased in the second half of the 1960s, it increased in the first half of the 1970s but with no distinct trend from then on. [Michie and Oughton \(2004\)](#) examined competitive balance in the English Premier League (1947–2004). The results showed a noticeable decline in competitive balance within the period under observation.

The following studies address the participation of foreign players and the effect on national leagues. [Flores, Forrest, and Tena \(2010\)](#), in their study concerning competitive balance across 17 European football leagues between the periods 1986–1987 to 1996–1997 (pre-Bosman) and 1997–1998 to 2005–2006 (post-Bosman), suggested that the dominance of the top clubs was curtailed in the years after the Bosman Ruling. They concluded that there was a “favorable impact” ([Flores et al., 2010](#), p. 556) on competitive balance due to the Bosman Ruling.

[Haan, Koning, and Witteloostuijn \(2002\)](#) examined the effects of the Bosman ruling and its introduction to the Champion's League. Employing a large sample from seven European Championships, the main conclusions drawn were that national competitive balances had not changed over time after the introduction of the Bosman Ruling and Champions League. However, on an international level, quality differences were witnessed to have increased after the introduction of the Bosman Ruling. A further study by [Haan, Koning, and Witteloostuijn \(2007\)](#), with extended data, concluded that for two European leagues competitive balance decreased after the Bosman ruling while the remaining showed no change at all. In a later study, [Haan and Koning \(2011\)](#) studied the effects of Institutional changes in European football. It suggests that the mobility of players beyond national borders increases competitive balance in large countries while it decreases in small countries.

In an effort to explain the causes of variability of competitive balance in a study concerning MLB, [Schmidt and Berri \(2003\)](#) concluded that the observed improvement in competitive balance over time was due to an increase in the talent pool and not because of institutional changes to assist the distribution of playing talent. Similarly, [Berri, Brook, Frick, Fenn, and Vicente-Mayoral \(2005\)](#) contended that the supply of tall people is a critical factor (as there aren't many people fulfilling this specific criterion) in improving the level of competitive balance in the NBA. As the labor market within the USA is limited, an influx of foreign players is necessary. Likewise, [Flores et al. \(2010\)](#) support the view that if the pool of players increases in size, the difference between teams will be smaller. On the same grounds of expanding this pool, [Goff, McCormick, and Tollison \(2002\)](#) and [Goff and Tollison \(2009\)](#) examined across professional baseball and basketball teams the innovation brought about by the racial integration of players and coaches. The notion that the availability of foreign players and their integration into team rosters enhances competitive balance is brought out in [Maxcy \(2002\)](#). He supports and reinforces this notion by showing evidence that mobility of players has positive effects on competitive balance either measured by the distribution of talent across teams within a season or by a club's potential to ameliorate their ranking position from season to season. In a later study by [Maxcy \(2009\)](#), the effects of the change of sharing revenue between clubs in Major League Baseball were examined. A divestment of talented players by low income teams was seen.

## 1.2. Purpose and hypothesis

Based on the literature reviewed above a theoretical model can be formulated, according to which the influx of foreign players is anticipated to have a favorable impact on competitive balance. Therefore, the aim of the present study is to evaluate within season competitive balance in Greek basketball and handball Championships in relation to the presence and number of foreign players. The working hypothesis is that the appearance of foreign players in increasing numbers will improve competitiveness in both sports.

## 2. Methods

It must be noted that in many published studies, the Bosman Ruling in 1995 acts as the reference point for evaluating competitive balance. In this study, however, we do not employ the Bosman Ruling as the pivotal point but the points at which foreign players first appeared in Greek Basketball and Handball championships mainly because in handball foreign players (including EU players) made their first appearance three years after the Bosman ruling.

Annual final rankings and team roster data were collected from the official archives of the Greek National Basketball and Handball Federations. For the purposes of the study, only the points collected at the end of the regular season were taken into account. The examined period is from 1965–1966 to 2012–2013 ( $n = 47$ ) for basketball and from 1983–1984 to 2012–2013 ( $n = 30$ ) for handball. National legislation allowed only Greek players to play until the 1988–1989 season in basketball. Initially, the number of foreign players was rather limited, but gradually increased afterwards. With respect to handball, a similar legislation came into force in 1999. This means that in basketball there are 22 seasons without and 25 with the presence of foreign players while in handball these numbers are 16 and 14 respectively. Annual Gross Domestic Product (GDP) was collected from the official website of the European Commission of Economic and Financial Affairs.<sup>1</sup> GDP is an important indicator of the economic health of a country. The introduction of foreign players in national leagues is related to this indicator. In our study we took into consideration the performance of Greek basketball clubs only in the Euro-League championships excluding handball because this particular sport did not exhibit similar performances from clubs.

<sup>1</sup> [http://ec.europa.eu/economy\\_finance/ameco/user/serie/ResultSerie.cfm](http://ec.europa.eu/economy_finance/ameco/user/serie/ResultSerie.cfm).

## 2.1. Competitive balance indices

There are many ways to quantify competitive balance in team sports (Zimbalist, 2002). The present study employs different indices which focus on the seasonal dimension of competitive balance. The first index is one of the most widely used indices called National Measure of Seasonal Imbalance (NAMSI), introduced by Goossens (2006), which measures the dispersion of winning percentages of teams. Essentially, NAMSI compares the observed standard deviation (STD) with the standard deviation of winning percentages in the case of a completely unbalanced league, which is the most undesirable case. Based on the calculation of Owen (2009, 2010), the formula for NAMSI is given by:

$$\text{NAMSI} = \frac{\text{STD}}{\left[ \frac{(N+1)}{12(N-1)} \right]^{1/2}}$$

where  $N$  stands for the number of teams that make up the league. The range of the index is from zero (perfectly balanced league) to one (completely unbalanced league).

There are also other proposed indices to quantify the dispersion among competing teams using various units of measurement usually borrowed from the industrial organization literature. However, none of them takes into account the multi-leveled structure of European sport leagues identified by Manasis et al. (2013). More specifically, European leagues display a three-level championship structure in which teams compete primarily to win the championship title (first level), secondly to qualify in European tournaments (second level) from as high a ranking as possible, and thirdly to avoid relegation (third level). In order to be contrasted against NAMSI, we also employ a set of new indices designed by Manasis et al. (2013) on the premise that the overall competitive balance in the European championship structure is determined by the corresponding levels of competition in the pursuit of the three-level objectives also observed in Greek handball and basketball. A main feature of those indices is that they can provide useful information for the ingredient sources of competitive balance to be used in our analysis for the foreign players. Essentially, Manasis et al. (2013) offers a new approach for the measurement of competitive balance by taking into account the relative importance of levels or ranking positions according to their significance from fans' perspective. They argue that this is implied in the work of Kringstad and Gerrard (2007) for the "need to move beyond competitive balance" (p. 170). Based on a weighted averaging approach, a simple benchmark (not necessarily the optimal one) is offered for the study of competitive balance in Europe (Manasis & Ntzoufras, 2014). In such a weighting scheme, the highest weight is given to the first place, followed by the qualifying places for European tournaments at a decay pattern of weight, and lastly the relegation places receive even lower weights.

The range of all discussed indices is from zero (perfect balance) to one (complete imbalance). It is noted that the development of the special indices is based on the Normalized Concentration Ratio (Manasis, Avgerinou, Ntzoufras, & Reade, 2011) which is the normalization of the frequently used  $CR_K$  index developed by Koning (2000). A short description of the indices is followed by the relevant formula.

(1) The Normalized Concentration Ratio for the Champion ( $NCR_1$ ), which captures the first level, describes the degree of champion domination, and is given by

$$NCR_1 = \frac{1}{2(N-1)} P_1 - 1$$

where  $P_1$  stands for the numbers of points collected by the champion and  $N$  is the number of teams participating in the league.

(2) The Adjusted Concentration Ratio ( $ACR_K$ ), which captures both first and second levels, and is defined as:

$$ACR_K = \frac{\sum_{i=1}^K NCR_i}{K} = \frac{1}{K} \left[ \sum_{i=1}^K w_i P_i - C_K \right],$$

where  $C_K$  is a constant term given by:

$$C_K = \sum_{i=1}^K \frac{N-1}{N-i},$$

and  $w_i$  stands for the weight attached to the  $i$ th team given by

$$w_i = \sum_{j=i}^K \frac{1}{2j(N-j)}, \quad \text{for } i < K < N/2.$$

$ACR_K$  is interpreted as the degree of domination by the top  $K$  teams as well as the degree of competition among the same  $K$  teams. The index rates the top  $K$  ranking positions at a decreasing function of their ranking position which is acceptable considering fans' interest (Manasis et al., 2013, p. 369).

(3) The Normalized Concentration Ratio for Relegated Teams ( $NCR^I$ ), which captures the third level given by:

$$NCR^I = \frac{N-1}{N-I} - \frac{1}{2(N-I)} \left( \frac{1}{I} \sum_{i=N-I+1}^N P_i \right)$$

where  $I$  stands for the number of relegated teams. The  $NCR^I$  describes the degree of weakness of the  $I$  relegated teams as compared to the remaining ones.

(4) The Special Concentration Ratio ( $SCR_k^I$ ) accounts for all three levels in the three-prized European leagues and expresses the weighted average of the three aforementioned indices.

$$SCR_k^I = \frac{\sum_{i=1}^K NCR_i + NCR^I}{K+1} = \frac{1}{K+1} \left[ \sum_{i=1}^K w_i P_i - \sum_{i=N-I+1}^N w_i P_i - C_K + C_I \right], \quad \text{for } I < K < N/2,$$

where  $C_I$  is a constant term derived from  $NCR^I$  and is given by  $(N-1)/(N-I)$ . The index rates the top  $K$  teams (at a decreasing rate) higher than the  $I$  relegated teams and is robust to  $N$ ,  $K$ , and  $I$  variation. For a full discussion regarding the weights and the features of the indices see Manasis et al. (2013) and Manasis and Ntzoufras (2014). The Special Concentration Ratio is a comprehensive index which conveys information from various aspects of competitive balance.

## 2.2. Statistical analysis

The distributions of all the competitive balance indices (CBI), as well as the number of foreign players per team (FPT) in the seasons when their presence was permitted, did not deviate from normality (Kolmogorov–Smirnov test). This allowed for the application of parametric procedures. Consequently the correlations among the CBI and between CBI and FPT were reported with the Pearson's correlation coefficients. The difference in the average number of foreign players per team between the two sports was tested with the Student's  $t$ -test for independent samples for all the years of foreign players presence in each sport and with the paired samples  $t$ -test when comparing seasons when both sports had foreign players. Likewise, comparisons of the average values of CBI in the absence and presence of foreign players (FP) for basketball and handball were also performed with the  $t$ -test.

The teams were divided into three groups in each season according to their final standings (1 = 1–4, 2 = 5–9, 3 = 10–14 in basketball and 1 = 1–4, 2 = 5–8, 3 = 9–12 in handball) and the average number of foreign players was compared between groups with the ANOVA procedure. The dependence of CBI on FPT as well as the presence-absence of foreign players, expressed through the dummy dichotomous variable of FP with values 0 and 1, was tested with regression analysis procedures. The Pearson's correlation coefficients ( $r$ ) between FPT and GDP for each sport were reported and differences of the correlation coefficients between basketball and handball were compared through their  $z$ -transformed values (Cohen, 1988). Finally, the dependence between the presence of foreign players and the performance of Greek basketball teams in European competitions was checked with the chi-square test. The level of significance was set at the conventional  $p < .05$ .

## 3. Results

Table 1 shows the correlation coefficients between the competitive balance indices for basketball and handball. The correlation coefficients between NAMS $I$  and  $SCR_k^I$  are very high  $p = .854$  and  $p = .907$ , respectively. Conversely, the top and bottom special indices of  $NCR_1$  and  $NCR^I$  are essentially uncorrelated  $p = .120$  and  $p = .075$ , respectively.

The average number of foreign players per team for the relevant period was 5.39 (2.58) in basketball and 2.39 (1.03) in handball. This difference was found to be statistically significant in favor of basketball (independent samples  $t$ -test:  $t(37) = 4.16$ ,  $p < .01$ ). As Fig. 1 shows, foreign players in basketball appeared much earlier and also their relative numbers were always greater than the respective numbers in handball. In the fourteen seasons that both sports had foreign players (1999–2012), the number of foreign players per team in basketball was 7.26 (1.10) versus 2.39 (1.03) in handball. The difference is statistically significant,  $t(13) = 16.1$ ,  $p < .01$ .

Also shown in Fig. 1 is the GDP of Greece in billions of Euros. It is clear that the FPT in both sports correlate with GDP. The Pearson correlation coefficient between GDP and FPT in basketball is  $r = .935$ , ( $p < .01$ ) and in handball  $r = .540$ , ( $p < .05$ ). The difference between the two Pearson's correlation coefficients is statistically significant ( $p < .05$ ). Furthermore, in both sports the CB indices, especially the  $NCR^I$  index, were significantly correlated with GDP ( $-0.417$  for basketball and  $-0.581$  for handball,  $p < .05$ ).

With regards to the distribution of foreign players per team, in basketball the ANOVA procedure with number of players as the dependent variable revealed no statistically significant differences between the three groups of teams according to their standings ( $p = NS$ ). On the contrary, in handball, especially in the first few years of the presence of foreign players, their numbers, as shown above, were significantly less than in basketball and were unevenly distributed among the three groups of teams ( $p < .05$ ), with the top-ranking teams having on average significantly more foreign players than the bottom-ranking teams 2.8 (0.3) versus 1.9 (0.5),  $p < .05$ . This means that in basketball, on average, all teams had the same number of foreign players, while in handball the top-ranking teams had more foreign players than the bottom-ranking teams.

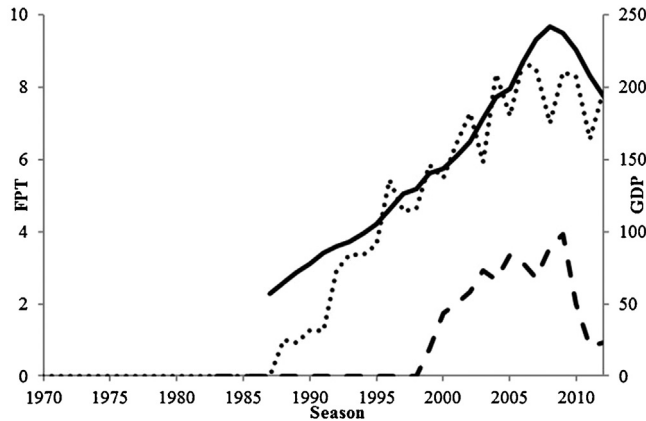


**Table 1**

Pearson's correlation coefficients between the competitive balance indices. For basketball the coefficients are shown above the diagonal. For handball the coefficients are shown below the diagonal.

	NAMSI	$SCR_K^I$	$NCR_1$	$ACR_K$	$NCR^I$
NAMSI	–	0.854**	0.483**	0.834**	0.558**
$SCR_K^I$	0.907**	–	0.668**	0.975**	0.634**
$NCR_1$	0.602**	0.852**	–	0.737**	0.120
$ACR_K$	0.808**	0.978**	0.891**	–	0.452**
$NCR^I$	0.684**	0.392*	0.075	0.192	–

\* Coefficient significant at the 0.05 level.  
\*\* Coefficient significant at the 0.01 level.



**Fig. 1.** Primary axis: Number of foreign players per team (FPT) per season for basketball (dotted line) and handball (dashed line). Secondary axis: Gross domestic product (GDP) of Greece per year (in billion €).

Table 2 shows the average values of the two global and three special indices of competitive balance in the absence and presence of foreign players independently for each sport. The independent samples *t*-test revealed that in basketball in the presence of foreign players there was a significant reduction of all global and special indices ( $p < .01$ ). In contrast, in handball the two global indices of NAMSI and  $SCR_K^I$  evidenced a significant increase ( $p < .05$ ) in the presence of foreign players, while with respect to the three special indices this increase did not achieve statistical significance ( $p > .05$ ).

In the periods of presence of foreign players their relative numbers in basketball were significantly and negatively correlated with the NAMSI and  $NCR^I$  indices, while in handball this significant correlation spread also to the  $ACR_K$  and  $SCR_K^I$  indices (see Table 3). The correlation of the  $NCR_1$  index was not significant in both sports.

Consequently, in both sports, FPT had the most significant effect on the global index of NAMSI and the special index of  $NCR^I$ . Table 4 shows the results of the regression analysis of the NAMSI and  $NCR^I$  indices as the dependent variables and FPT as the independent variable also introducing the dichotomous FP variable (absence–presence of foreign players) as a dummy variable with corresponding values 0 and 1.

**Table 2**

Comparisons of the average values of the five competitive balance indices (CBI) between the absence and presence of foreign players (FP) for basketball and handball with the independent samples *t*-test.

Sport	Basketball				<i>p</i> ( <i>t</i> -test)	Handball				<i>p</i> ( <i>t</i> -test)
	Absence		Presence			Absence		Presence		
	Average	SD	Average	SD		Average	SD	Average	SD	
NAMSI	0.77	0.07	0.70	0.09	0.004**	0.72	0.07	0.79	0.10	0.043*
$SCR_K^I$	0.80	0.07	0.73	0.08	0.007**	0.70	0.08	0.77	0.10	0.045*
$NCR_1$	0.87	0.10	0.77	0.12	0.006**	0.70	0.10	0.75	0.12	0.217
$ACR_K$	0.81	0.07	0.74	0.08	0.007**	0.69	0.11	0.77	0.10	0.064
$NCR^I$	0.73	0.14	0.64	0.09	0.009**	0.75	0.09	0.80	0.14	0.244

\* *p*-value significant at the 0.05 level.  
\*\* *p*-value significant at the 0.01 level.

**Table 3**  
Pearson's correlation coefficients (*r*) between the number of foreign players per team (FPT) and the competitive balance indices (CBI).

CBI	Basketball	Handball
NAMSI	-0.494*	-0.643*
SCR <sub>k</sub>	-0.307	-0.616*
NCR <sub>1</sub>	-0.095	-0.349
ACR <sub>k</sub>	-0.249	-0.555*
NCR <sup>l</sup>	-0.489*	-0.625*

\* Significant at the 0.05 level.

**Table 4**  
Regression analysis of the NAMSI and NCR<sup>l</sup> indices on the presence (FP) and the number of foreign players per team (FPT) in basketball and handball. The dummy variable (FP) takes the values 0 for the absence and 1 for the presence of foreign players.

CBI	Sport	Basketball		R <sup>2</sup>	Handball		R <sup>2</sup>
		Predictor	Coefficient		p-value	Coefficient	
NAMSI	FP	0.005	0.901	0.323	0.235	0.001**	0.364
	FPT	-0.016	0.011*		-0.018	0.004**	
NCR <sup>l</sup>	FP	-0.16	0.777	0.212	0.251	0.002**	0.279
	FPT	-0.017	0.046*		-0.085	0.005**	

\* p-value significant at the 0.05 level.

\*\* p-value significant at the 0.01 level.

In basketball there was a significant negative effect of FPT on both indices. The effect of the actual presence of foreign players through the dummy variable of FP is conveyed through the FPT. In handball there was also a significant initial positive effect of the dummy variable of FP, followed by the significant negative effect of FPT.

The scatterplots in Fig. 2 help clarify the significant effect of the number of foreign players on the NAMSI and NCR<sup>l</sup> index in basketball and handball respectively. The scatterplots include only the periods with presence of foreign players. As the corresponding coefficients of determination (R<sup>2</sup>) in Table 4 show, 32.3% of the variability of the global index (NAMSI) in basketball and 36.4% in handball can be explained by the presence and/or number of foreign players.

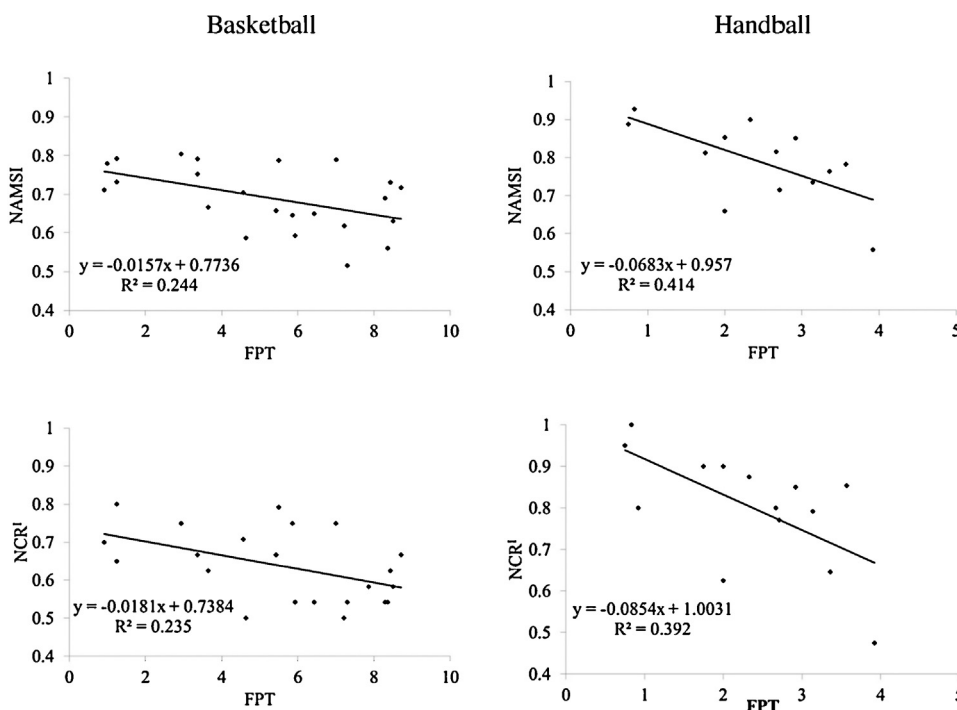


Fig. 2. Scatterplot and regression analysis of the dependence of the NAMSI and NCR<sup>l</sup> indices on the number of foreign players per team (FPT) in basketball and handball.

Finally in the 22 seasons with no foreign players Greek basketball clubs in the Euro-League championships reached the semifinals only 3 times (13.6%), while in the 25 seasons with foreign players Greek basketball clubs played in the final four 19 times (76.0%) winning the championship 9 times. The difference between the two proportions is obviously statistically significant ( $\chi^2 = 18.3$ ,  $df = 1$ ,  $p < .001$ ).

#### 4. Discussion

In the present study five indices of competitive balance were longitudinally analyzed in Greek basketball and handball leagues. The first two (NAMS<sub>I</sub> and SCR<sub>K</sub><sup>I</sup>) are global indices and estimate the overall within season competitive balance. The other three (NCR<sub>1</sub>, ACR<sub>K</sub> and NCR<sup>I</sup>) are special multilevel indices, designed to estimate different aspects of within season competitive balance. All competitive balance indices are structured in such way that a decrease in the value of the index signifies an increase in competitiveness.

It has been proven that SCR<sub>K</sub><sup>I</sup> conveys practically the same information regarding overall competitiveness with the NAMS<sub>I</sub> index for both examined sports. On the other hand, the absence of correlation between the first level index, NCR<sub>1</sub>, which refers to the competition for the championship title and the third level index, NCR<sup>I</sup>, which refers to the candidate teams for relegation means that competitiveness for the championship is not necessarily correlated with competitiveness between teams striving to remain in the league. This is witnessed in both sports. Consequently competitiveness may vary at different levels within the same league.

In Greek national leagues, foreign players appeared much earlier in basketball than in handball. Furthermore the number of foreign players per team in basketball was significantly greater in all seasons. This difference is even more striking considering that the number of basketball players on the court is five, while in handball there are seven players. The fact that there are significantly more foreign players in basketball than in handball can be due to it being far more popular than handball. Consequently, this led to more income from increased sponsoring and advertising and laid the foundation for a completely different financial environment for each sport. This can be seen from the fact that handball had very limited TV coverage from which the clubs had no income whatsoever which could have been used to invest in foreign players. On the other hand, basketball has by far greater media coverage from which the teams gained financially through contracts by TV companies. The findings also show that in basketball foreign players were evenly distributed amongst teams regardless of their ranking, while in handball, especially in the first years, the number of foreign players among the top-ranking teams was significantly greater than among the bottom-ranking teams.

In both sports the numbers of foreign players co-vary with the Gross Domestic Product (GDP). This means that the influx of foreign players is very highly dependent on the country's macroeconomic status. This is more the case in basketball than in handball. The fact that GDP also correlates with the CB indices is clearly a case of mediation effect, since it is not conceivable that GDP can have a direct effect on CB. Rather this effect is explained by the mediation effect of the increase of foreign players; that is, the increase of GDP allows teams to obtain more foreign players and the increase of foreign players in turn has a positive effect on CB. Moreover the fact that the indirect effect of GDP is reflected primarily on the NCR<sup>I</sup> index indicates that good economic times allow even the bottom-ranking teams to enhance their rosters with foreign players and probably with good quality foreign players.

Allowing foreign players to participate in national championships was an important decision. Many researchers have studied the effect of foreign players on national championships either from a financial or competitive balance aspect. According to Andreff (2006), an appreciable growth in the participation of foreign players was witnessed in European football leagues. A similar phenomenon was seen in the European National basketball leagues, where the average number of foreign players per team increased significantly after the Bosman Ruling of 1995 (Alvarez, Forrest, Sanz, & Tena, 2011). In many studies the focal point is the Bosman Ruling, which undoubtedly was a turning point, while in the current study the key point is the entry point of foreign players into the national leagues of basketball and handball.

The comparison of the competitive balance indices between the periods of absence and presence of foreign players showed that there was an overall improvement of competitive balance in basketball in both global and special indices, while in handball there was deterioration of the two global indices. However, considering only the simple qualitative dichotomy of the absence and presence of foreign players may lead to inconclusive assumptions. Subsequent analysis revealed that competitive balance during the periods of participation of foreign players for both sports exhibited different results dependent on the sport and level of competitive balance. Overall, in both sports, there was steady improvement of the global indices collateral with the increase of foreign players.

Conversely, the increasing number of foreign players per team did not seem to have any effect on the first level index reflected by NCR<sub>1</sub>, which embodies competitive balance for the first place team in the league. This can be explained by the fact that the first place teams, for both sports, are those that usually have the financial backing to get the maximum number of foreign players and possibly the most talented. This is supported by Hoehn and Szymanski (1999), where a team with a higher budget translates to better performance.

A different pattern arises when we consider the index NCR<sup>I</sup> (third level of competitive balance), which relates to candidate teams for relegation. Relegation entails a fundamental difference between European and American model of sports (Buzzacchi, Szymanski, & Valletti, 2003; Troelsen & Dejonghe, 2006). There is a significant negative correlation between the number of foreign players and the indicator, meaning a significant positive correlation between the number of foreign players and competitive balance. It seems that when the teams occupying the last standings have the ability to have a



satisfactory number of foreign players this inevitably reinforces the specific competitive balance, reflected by the corresponding special index of NCR<sup>l</sup>. This reinforces the importance of the availability of an adequate number of foreign players in the league.

Finally the effect of the number of players on the second level ACR<sub>K</sub> index is not negligible but not as strong as the third level. Consequently in both sports there is an increasing trend of the effect of the number of foreign players from the first to the third level of competitive balance.

Based on the above comments, it seems that the presence and number of foreign players most significantly affect the NAMSI global index and the NCR<sup>l</sup> special index, for which regression models were applied. In handball, the initial presence of foreign players (FP) had a negative effect on competitiveness, which however gradually improved with the increase of the influx of foreign players (FPT). This is probably a consequence of the fact that, as already noted, the initial distribution of the foreign players in handball was imbalanced among top and bottom ranking teams. On the contrary, in basketball no initial setback of competitiveness was observed with the arrival of foreign players (FP), showing a continual improvement in parallel with the increase in the number of foreign players (FPT).

In conclusion, in handball, the arrival of foreign players signified its passage from pure amateurism to a more “professional” status, shared initially by a few elite teams. This brought a disturbance in the equality between teams that led to the early setback of competitiveness. On the contrary, the professional status of basketball was established before the arrival of foreign players and their incorporation into the teams followed a more natural course that helped improve competitiveness.

Overall about one third of the variability of the global index of NAMSI seems to be attributable to the presence and/or number of foreign players. This proportion is substantial, but it also shows that there are also other factors, not taken into consideration in the current model, that are instrumental in the structure of competitive balance. Among these factors are whether the structure of the leagues are of the “open” or “closed” type which refers to the relegation and promotion systems that exist in the European sports environment but not seen in North America. The promotion and relegation system in sports leagues studied by Noll (2002) had ambiguous results on competitive balance. The decisions taken by the sports authorities concerning the rules to which the leagues are to abide by also seem to affect competitive balance. According to Booth (2000, 2004) the application of a team salary cap and national player draft provides probable cause for an increase in competitive balance but together with club location there is a need for further investigation (Booth, 2005). The transfer system and its effect on trying to maintain a reasonably balanced competition cannot be undervalued (Kesenne, 2014). Other factors that may influence competitive balance are the number of teams participating (Cairns, 1987), while Groot (2008) refers to an optimal size of competition without conclusive detrimental or beneficial effect on competitive balance. Further parameters are the player market, revenue sharing and competition policy (Buzzacchi, Szymanski, & Valletti, 2001; Buzzacchi et al., 2003). Revenue sharing within a league may influence competitive balance taking into consideration the characteristics of the owners, whether they are of the “profit” or “win” type (Andreff & Bourg, 2006; Kesenne, 2000; Kesenne, 2006). The differences in economic power among all the participating teams in a league are those which dictate competitive balance (Szymanski & Kuypers, 1999). The degree of economic wealth of team implies more ability to attract talented players. As a result the concentration of playing talent between teams in a league is of critical importance and directly affects competitive balance (Schmidt & Berri, 2005).

Finally, as evidenced by the performance of Greek basketball clubs in European competitions, the increase in competitiveness of the national league due to the presence of foreign players was accompanied by an increase in the quality, performance and achievements of the top teams that participated in the European competitions. Similar results were found with respect to the performance of the Greek National team in the EuroBasket championships (Meletakos, Noutsos, Manasis, & Bayios, 2014), meaning that the influx of foreign players was instrumental in the positive association between competitiveness and performance. In other words, the positive impact of foreign players already shown for the Greek National team can be extended to domestic clubs. In hindsight the Greek sports authorities' decision to allow foreign player participation had a general positive effect. Our results cannot be generalized because they apply for a specific sport and country according to a set of factors, in particular, the league's level of development and the country's GDP.

## 5. Conclusions

In conclusion, foreign players in Greece appeared earlier and in greater numbers in basketball than in handball as a result of the more professional status of basketball. The influx of foreign players depends on the country's macroeconomic status and in turn has a positive effect on competitiveness. In handball the initial appearance of foreign players had a negative effect on competitiveness due to their uneven distribution among top and bottom ranking teams. However, as their relative numbers increased, competitiveness improved, especially for the bottom ranking teams. In basketball the increase in competitiveness of the national league due to the increase in numbers of foreign players that were evenly distributed among all teams resulted in an upsurge in the quality, performance and achievements of the top teams participating in the European competitions.

## 6. Management implications

In a liberal player labor market characterized by large movements of not only indigenous but also foreign players between teams and between countries (Andreff, 2006), the role of the team manager is key in improving the team's performance and

consequently the status of the league. In a formal transfer market the objectives of clubs should be to improve their playing strength by easing the movement of players and by providing better opportunities for development, increased earnings and job satisfaction for players (Carmichael & Thomas, 1993). Knowing that excessive imbalance in sports competitions causes a decrease in fan interest (Kesenne, 2006) and impacts current and future wealth of the team, the decisions of the team manager must evaluate the former along with club objectives, the environment and rules governing league operation and certainly fan preferences. The internationalization of sports that encompasses professionals as well as amateurs has given rise to sport migration (Maguire & Falcou, 2011). The finding in this study that foreign player recruitment in sports enhances competitiveness must be viewed critically. However, the unchecked recruitment of foreign players might provoke problems among the indigenous players such as less participation time and possible stunting the development of the player. On the other hand, the introduction of foreign players especially talented players, may well provide the means to improve these indigenous players. The requirement for the team manager and owners of the club is to make the optimum decision. The employment of foreign players must also take into consideration the fans' outlook which in this case too can be ambiguous. Fans find it desirable to see well-known talented foreign players on their team but at the same time they have a tendency to relate to indigenous players and to those who have been playing for a long time for their team. The team manager must tackle the cultural and educational issues that arise when introducing foreign players and their effect on the team. The result of his work affects the team's performance but simultaneously the status of the league. Knowledge of the above intricate complexities provides the team manager the tools to make optimum decisions.

## 7. Directions for future research

The current study examined the influence of foreign player recruitment by teams in the top leagues only from a quantitative point of view using the number of foreign players as a variable. Future research incorporating the qualitative characteristics of foreign players is warranted. One of a number of characteristics may include whether or not the player was and even more importantly if he is a member of his national team and has won titles while playing for his national team. Another parameter to be considered is whether he has been a player of top level teams in his country or abroad and again if he has won titles with these teams. The fact that the player has played at recognized top level basketball leagues such as the NBA or the Bundesliga for handball is another important factor to be considered. Finally, a player's age is an important factor related to performance which can be examined. It is not unusual to witness "superstar players" going to lesser leagues but at an age approaching the end of their career. All the above could form the basis of a multi-factor model based on these qualitative characteristics. Another aspect for future research may include examining the competitive balance of lower ranked leagues within a country. These leagues form, in many cases, the pool of players from which teams in the top leagues choose their players. Therefore we could ask ourselves if and to what extent the lower ranked leagues influence competitive balance in the leagues above them.

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