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Impact of the UEFA Nations League on competitive balance, competitive intensity, and fairness in European men's national team football

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ABSTRACT

This paper investigates the multifaceted dimensions of sport promotion, development, and integrity within the context of men's football in Europe. It specifically focuses on the impact of a newly introduced competition, the UEFA (Union of European Football Associations) Nations League (UNL), on these three dimensions. The study utilises a dataset comprising 1,058 games played over two distinct periods: 503 games from 2014–2016 (pre-UNL) and 555 games from 2018–2021 (UNL era). The primary areas of interest are competitive balance (CB) and competitive intensity (CI), measured at the intra-match (both CB and CI) and post-match (CB only) levels, and fairness. Regressions and statistical tests were conducted to explain the determinants of CB and compare CB and CI between both periods. The analysis reveals that CB deteriorated, primarily attributed to changing incentives for the strongest and weakest teams during Euro qualifying matches. By contrast, CI increased due to the UNL's replacement of most friendly games. While recent literature has raised potential fairness issues due to the establishment of the UNL, findings of this study suggest that the integrity of national men's football team competitions and games in Europe remained intact during this period. This article advances knowledge of CB and CI. Besides, it also provides empirical evidence that the UNL did not compromise the fairness of national men's football team competitions and games in Europe. By bringing CB, CI, and fairness together, this study highlights the crucial role of sports organisations in promoting and developing their sport, while also safeguarding its integrity.

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Promotion; development; integrity; incentives; safeguarding; European football

Introduction

Sport promotion, development, and integrity are critical dimensions of sport policy and strategy, influencing the objectives of sports organisations (Houlihan 2000, Bloyce and Smith 2010, Viollet et al. 2020, 2023). This paper delves into these critical dimensions within the context of football, focusing on the Union of European Football Associations (UEFA) and the impact of its decisions on the promotion, development, and integrity of the men's game in Europe. Precisely, the study aims to assess the impact of a specific decision – the introduction of the UEFA Nations League (UNL) – on the competitive balance (CB),

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competitive intensity (CI) and fairness of national men's football team competitions and games in Europe. CB can be defined as a tournament structure with relatively equal playing strength among its members (Forrest and Simmons 2002). CI, as defined by Kringstad and Gerrard (2004), is '*the degree of competition within the league/tournament with regards to its prize structure*' (p. 120).

The UNL, initiated in 2018 after approval in 2014 (UEFA 2014), involves all senior men's national teams of the 55 UEFA member associations. This tournament largely replaces the international friendly games previously played on the FIFA (Fédération Internationale de Football Association) International Match Calendar, offering more competitive matches. National teams are organised into leagues and groups based on rankings derived from their recent results, with group winners advancing to the final round to determine the league champion and a system of promotions and relegations between leagues. The UNL's format allows teams of comparable sporting standard to compete against each other, ultimately favouring CB. Moreover, in contrast to friendly games, the UNL offers national teams meaningful games with tangible goals to compete for, such as qualification for the final round and/or promotion, and the fight against relegation. Furthermore, the UNL is linked to the Euro qualifying, providing teams with an additional opportunity for qualification.

At the national team level, CB and CI serve as indicators of sport promotion and development (Scelles 2021a, 2021b). Higher CB and CI are more likely when teams exhibit comparable sporting standards, reflecting the promotion and development of a sport across countries. Also, higher CB and CI are theoretically associated with increased demand (Fort and Maxcy 2003). Therefore, CB and CI contribute to sport promotion and potential development, attracting more people and generating additional revenue. Empirical evidence generally supports this relationship for CI, while findings regarding CB are often contradictory (Bond and Addesa 2019, 2020, Valenti *et al*. 2020, Van Reeth and Osokin 2020, Addesa *et al*. 2021, Scelles and François 2021, Hautbois *et al*. 2022, Wills *et al*. 2022). The impact of CB and CI on fan demand concerns the stream of literature on the Uncertainty of Outcome Hypothesis, as opposed to the Analysis of Competitive Balance, which explores determinants and evolution of CB and CI resulting from changes in competition format (Fort and Maxcy 2003). The present research focuses on the latter perspective.

CB and CI are pivotal targets in the policy framework of international sports federations as indicators of sport promotion and development. UEFA, for example, highlights these objectives in its current strategy, particularly within the 'competitiveness' pillar, which aims to ensure UEFA tournaments are competitive and meaningful for all, maintaining CB through sporting and financial measures (UEFA 2019). However, there is a gap in the academic literature regarding whether the UNL truly contributes to accomplishing these objectives – specifically, its impact on the overall competitiveness of national men's football team competitions and games in Europe. Also, UEFA's 'trust' pillar emphasises the importance of safeguarding the integrity of football. Some authors have suggested that the coexistence of the UNL and Euro qualifying theoretically induces fairness issues (Csató 2020, 2021, Haugen and Krumer 2021). Nevertheless, there is no empirical research on the UNL's impact on the overall fairness of European national men's football team competitions and games, presenting another knowledge gap.

The current study aims to address these two gaps by first assessing the overall impact of the UNL on the CB and CI of games played between European national men's football teams. To achieve this, we compare the CB and CI of games played from August 2014 to July 2016 (Euro qualifying 2016 and Euro 2016, and friendly games between UEFA nations during this period) to those played from August 2018 to July 2020 and from May to July 2021 (Euro 2020 qualifying and Euro 2020, 2018–19 UNL, and friendly games between UEFA nations during this period). Secondly, we compare the fairness of games and competitions played over the two identified periods, i.e. before and since the launch of the UNL.

Empirical setting, conceptual foundation and hypotheses

Empirical setting

To understand the recent evolution of CB, CI, and fairness in European men's national team football, it is necessary to present the changes operated in relation to the competitions and games played. Key changes are developed in the next subsections. Figures 1 and 2 offer an overview of the qualification and seeding for Euros 2016 and 2020, respectively.

It should be noted that both Euro 2016 and Euro 2020 consisted of six groups of four teams. In both cases, the top two teams from each group (12 teams) and the four best third-ranked teams across all groups advanced to the round of 16. However, a notable difference arose in Euro 2020 due to the tournament being held across multiple countries in Europe. As such, six hosting countries had home advantage in their three group stage games (Italy, Denmark, the Netherlands, England, Spain, and Germany), while three other hosting countries had home advantage in two group stage games (Russia, Scotland, and Hungary). As raised by Haugen and Krumer (2021), this arrangement potentially put top teams like Belgium (the best team in Euro 2020 qualifying) at a disadvantage, as they had to play two 'home' teams, despite not having the benefit of hosting any matches in their country.

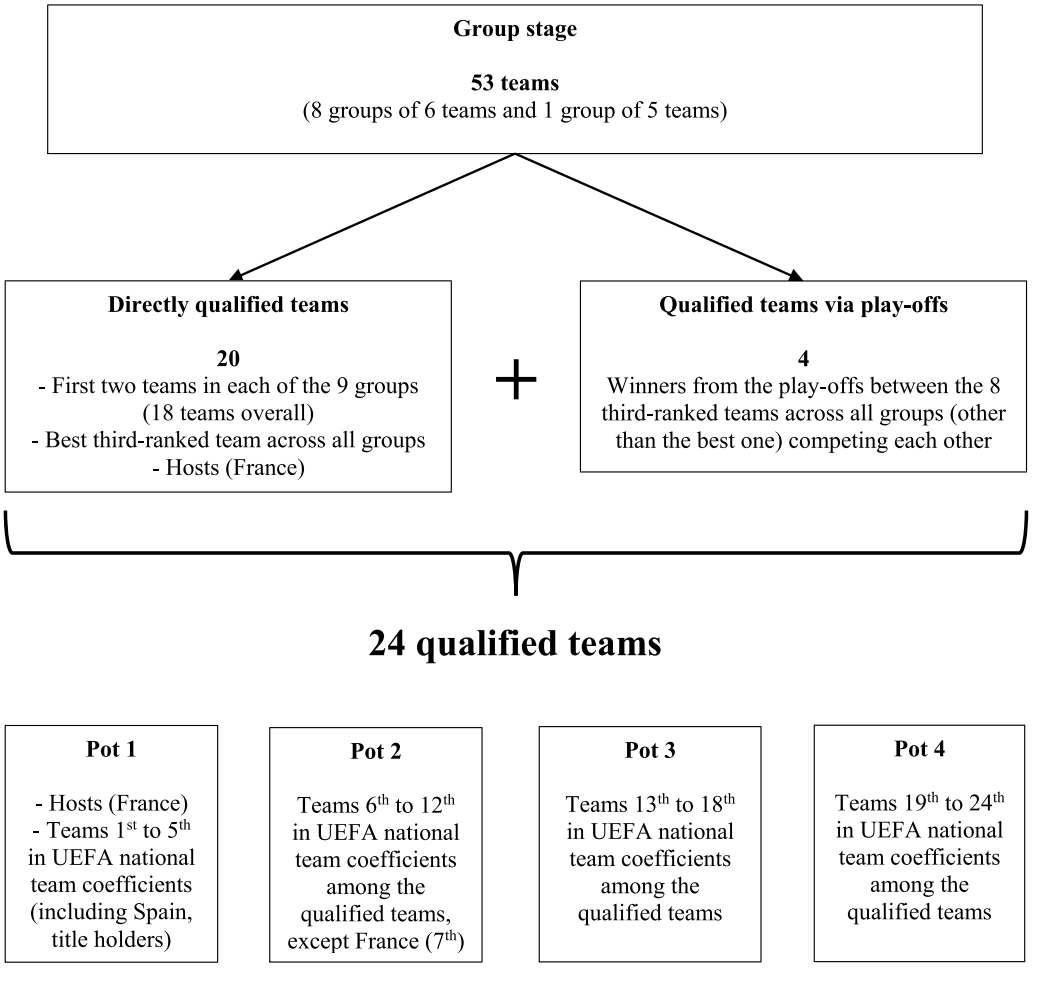

Figure 1. Qualification and seeding for UEFA euro 2016.

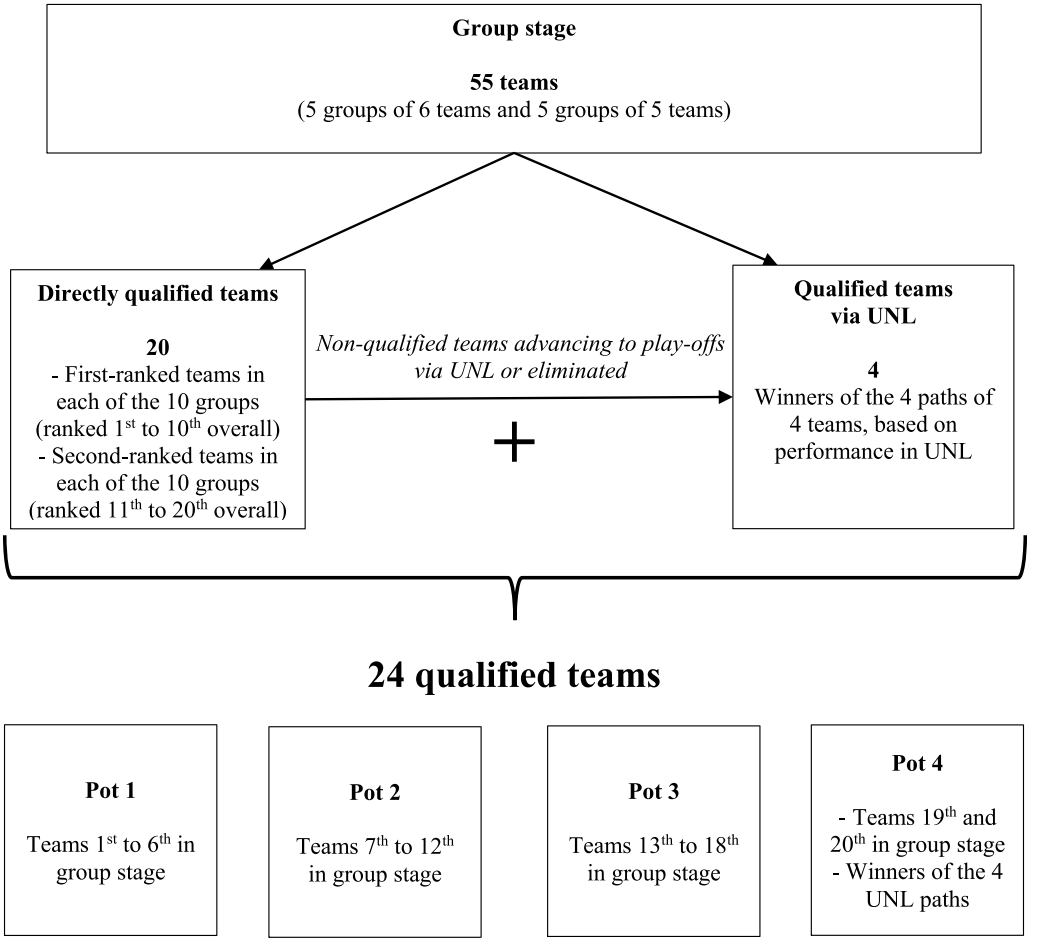

Figure 2. Qualification and seeding for UEFA euro 2020.

Talent pools across countries as primary determinant of CB and CI

The primary determinant of CB and CI in national team football is the differences in population of talent across countries, consistent with evolutionary biology and the so-called Gould hypothesis (Gould 1983). Fort and Quirk (1995) discussed imbalance in market size as a reason for a lack of CB, although the way it affects sporting performance is different in professional sports leagues (Fort and Quirk's focus) vs. national team competitions: in the former, it generates different levels of revenue which leads to different abilities to attract global talents and hence differences in sporting performance; in the latter, it generates different talent pools and hence differences in sporting performance.

Schmidt and Berri (2003) relied on the Gould hypothesis to explain the evolution of CB in the North American Major League Baseball (MLB). According to Scelles (2021b), the same concept can be adapted to the context of national team football. The basic idea is that the differences in the population of talent (i.e. the talent pool) across countries lead to differences in players' abilities from one country to another. Consequently, when countries with considerably different talent pool sizes participate in the same competitions, lower levels of CB and CI within those competitions are more likely.

Research investigating the determinants of national men's football team performance often utilises a country's population as a proxy of talent pool (Kuper and Szymanski 2012, Scelles and Andreff 2019, Wan *et al*. 2020). Evidence suggests that population has a positive impact on performance, as measured by FIFA points. Nevertheless, countries with larger markets (i.e. population size) tend to support a broader range of goods, resulting in a more crowded product space (Desmet and Parente 2010). Applied to sports, this implies that football experiences greater challenges to attract participants in larger markets due to potential competition with other sports. Additionally, it is important to note that having a population twice the size of another country does not necessarily mean its best players are twice as skilled. To address this decreasing return, the data used in academic research often undergo logarithmic transformation, which reduces the gaps between countries, as opposed to exponential transformation.

In the 2018–19 UNL, teams were grouped based on their sporting level, a move intended to promote CB. However, higher disparities in sporting performance could be expected in the lowest league (i.e. League D), given the greater differences in population (expressed in natural logarithm as a proxy for talent pool) compared to other leagues.[1] Accordingly, two hypotheses are formulated:

H1.1: In the UNL, CB is lower in League D than in the other leagues.

H1.2: In the UNL, CI is lower in League D than in the other leagues.

Competition format and balance between competitive and friendly games as impacting CB and CI

In addition to the influence of talent pools across countries, competition format can significantly impact CB and CI (Scelles 2021a). The effects on CB can vary based on whether the format provides stronger incentives for the strongest or weakest teams. For example, the format of Euro 2016 qualifying likely had a positive impact on CB. In this format, the best teams may not have had a strong incentive to perform at their best until the end, as they could secure qualification early without the need to strive for first place over second place due to the seeding for the final tournament being based on UEFA national team coefficients rather than the overall ranking across groups (see Figure 1). Conversely, other teams – that might not have been hopeful of direct qualification or aimed for at least a playoff spot without the third-ranked team 'prize' – had a greater incentive to give their best performance due to the existence of the latter prize. In contrast, the format of Euro 2020 qualifying may have had a negative impact on CB. This is because the best teams may have had an incentive to play their best until the end, as their overall ranking across groups, based on the number of points and goal difference, affected their seeding for the final tournament (see Figure 2). Meanwhile, other teams – that may have been hopeful of a qualification at least for the playoffs with the third-ranked team 'prize' present in the previous edition – may have had a reduced incentive to give their best since the latter prize was no longer available. Accordingly, the following hypothesis is formulated:

H2.1: There is a decrease in CB between the two periods studied.

The balance between competitive and friendly games also impacts CI. For example, the UNL replaced friendly games, which typically lack CI, with competitive games that inherently carry CI for at least most of them (Scelles 2021a). It is expected that this shift more than compensated the potential decrease in CI during Euro qualifying, which could occur due to the potential decrease in CB

explained in the previous hypothesis and the removal of the third-ranked position without a prize. Accordingly, the following hypothesis is formulated:

H2.2: There is an increase in CI between the two periods studied.

Fairness: favoured or jeopardised by CB and CI?

Sport is intrinsically linked with the values of integrity, fairness, and justice (Arnold 1994, Savulescu 2006, Csató 2020, 2021, 2022, 2023a, 2023b, 2023c, Haugen and Krumer 2021). These values highlight the expectation that the rules governing a sport should be applied impartially to all participants to prevent any player or team from gaining an unfair advantage (Arnold 1994). However, in competitive activities, competitors are often driven by the rewards and permitted by the low penalties associated with seeking an unfair advantage (Savulescu 2006). In the world of sports, scenarios may arise where both opponents in a game have an incentive to 'agree' on a specific outcome, typically when the result allows both competitors to achieve their respective objectives. Such an 'agreement' would inherently come at the expense of (an)other team(s). Therefore, it is fundamental that sport governing bodies aim for decisions, competition formats and rules that minimise the risk of participants looking for and benefitting from possible unfair advantages.

To some extent, CB and CI are supposed to contribute to fairness. For CB, when both teams participating in a game possess similar sporting standard (high pre-match CB), the game should be balanced (high intra-match CB), with both teams being incentivised to play their best until the end (a fair game). Conversely, when both teams have considerably different sporting standard (low pre-match CB), there is a risk that the weaker team may reduce its effort as the goal difference between the teams widens (low intra-match CB), resulting in less-than-optimal performance until the end (an unfair game).[2] For CI, if both teams have a prize to compete for (high pre-match CI for both teams), they should both play their best, and the outcome should accurately reflect their respective strengths (a fair game). However, if only one team has a prize to compete for (high pre-match CI only for this team), there is a risk that the other team may not play at its best, and the outcome may not fairly represent their respective strengths, potentially favouring the team with something at stake, at the possible expense of another team (unfair game). When neither of the two teams has anything left to compete for (no CI), both teams may not give their best, and the outcome may not be a fair representation of their respective strengths.

In the context of European men's national team football in recent years, some authors have suggested that the coexistence of the UNL and Euro qualifying or European Qualifiers for the FIFA (Federation Internationale de Football Association) World Cup induces fairness issues (Csató 2020, 2021, 2022, Haugen and Krumer 2021). At the competition level, Csató (2020, 2021) showed that a group winner in the UNL might face stronger opponents in the Euro qualifying play-offs than a non-group winner from the same league, despite its better performance. Haugen and Krumer (2021) demonstrated several shortcomings of the coexistence of the two aforementioned competitions, including incentives to be the worst team in the group, but also fairness issues at the game level such as incentives to intentionally lose a single game in Euro qualifying to improve chances to take part in the Euro qualifying play-offs, lack of incentives to win and home advantage against the top teams. The first shortcoming at the game level was also explored further by Csató (2022), who employed computer simulations to reveal that the threat of 'tanking' can be substantially mitigated by implementing a carefully selected set of draw restrictions. The fairness issues raised in these discussions have the potential to jeopardise the integrity of the competitions. Therefore, a key question arises regarding the compatibility of the 'competitiveness' and 'trust' pillars outlined in the UEFA strategy. This is because providing incentives to all teams to foster the development and

promotion of football might eventually lead to lack of fairness in the competitions in which they participate. Accordingly, the following hypotheses are formulated:

H3.1: There is a decrease in fairness at the competition level between the two periods studied.

H3.2: There is a decrease in fairness at the game level between the two periods studied.

It must be noted that our approach is different from that applied by Csató in his research: while he aimed to evidence potential fairness issues raised by the UNL (i.e. that could happen) and remedies, our focus is on actual fairness issues (i.e. that happened).

Methodology

Measurement

Table 1 provides an overview of the measures used in the study to test the formulated hypotheses. The goal difference at the end of the match is self-explanatory and therefore not developed further below.

Intra-match CB and CI

Intra-match measures of CB and CI are appropriate for competitions that include knockout stages or play-offs, as observed in recent studies on national team football and/or UEFA competitions

Table 1. Overview of the measures used in the study.

Category	Type	Definition	Measure
Competitiveness	Match competitive balance	Goal difference at the end of the match	Home goals minus away goals
	Intra-match competitive balance (IMCB)	Intra-match uncertainty (IMU)	Percentage of game-time during which the score difference between the competing teams is no greater than one goal
		Intra-match fluctuations (IMF)	Average number of times per game a goal determines a change on the 'state' of the score, i.e. team A leading, draw, or team B leading
	Intra-match competitive intensity (IMCI)	Intra-match uncertainty (IMU')	Percentage of game-time during which the next goal can change the situation of at least one of the two competing teams in relation to at least one prize
		Intra-match fluctuations (IMF')	Average number of times per game a goal changes the situation of at least one of the two competing teams in relation to at least one prize
(Un)fairness	Competition (CF)	Group winner facing stronger opponents than non-group winner in the next stages (CF1)	Average ranking of (potential) opponents in the next stages
		Not only the best teams on the pitch qualifying due to UNL (CF2)	Comparison with a situation without UNL
	Game (GF)	Home advantage (GF1)	Number/percentage of games with home advantage not due to better earlier performance in the competition
		Incentive to lose (GF2)	Number/percentage of games where losing can be more beneficial than winning or drawing
		Only one team in contention (GF3)	Number/percentage of games where only one team has something to compete for
		No team in contention (GF4)	Number/percentage of games where both teams have nothing to compete for anymore

CF = competition fairness; GF = game fairness; CF1 = competition fairness indicator 1; CF2 = competition fairness indicator 2; GF1 = game fairness indicator 1; GF2 = game fairness indicator 2; GF3 = game fairness indicator 3; GF4 = game fairness indicator 4.

(Scelles 2021a, 2021b, François *et al*. 2022). Therefore, this research employs intra-match CB (IMCB) and CI (IMCI). Both IMCB and IMCI are measured through two indicators: intra-match uncertainty and intra-match fluctuations (see e.g. François *et al*. 2022).

For IMCB, to illustrate how to calculate intra-match uncertainty (IMU) and intra-match fluctuations (IMF), consider the game between Belgium and Cyprus in UEFA Euro 2020 qualifying where the score moved from 0–0 to 0–1, 1–1, 2–1 then 3–1 at the 41st minute of the game before ending as 6–1 (a football game lasting 90 minutes). In this case, there is uncertainty during 41 minutes and IMU is 45.6% (= 41/90). The value of intra-match fluctuations (IMF) would be equal to 3: 1 from 0–0 (draw) to 0–1 (Cyprus leading); 1 from 0–1 to 1–1 (draw); and 1 from 1–1 to 2–1 (Belgium leading). No additional fluctuation is considered afterwards since Belgium remained the leading team.

For IMCI, if both teams have nothing to compete for (e.g. team A is sure to end first in its group and team B is already eliminated, as this was the case in the aforementioned game between Belgium and Cyprus), intra-match uncertainty (IMU') = 0% and intra-match fluctuations (IMF') = 0. A similar situation occurs if the game is the return game of a two-legged tie, team A won the first leg 2–0 and team B is unable to score in the return game, as this was the case in UEFA Euro 2012 qualifying play-offs between Czech Republic (team A) and Montenegro (team B). This is because the goal difference between both teams is never less than two goals in aggregate. By contrast, consider a game where the score moved from 1–0, 1–1, 2–1 then 3–1 before the 90th minute, but a win with a two goals margin rather than a one goal margin affected the prize for the leading team. This was the case in the game between Croatia and Scotland in UEFA Euro 2020 Group D, with Croatia ending second and playing against Spain in the next round with a two goals margin win vs. third and playing against the Netherlands in the next round with a one goal margin win. IMU' = 100% since, even at 3–1, Croatia was under the threat of not having a two goals margin anymore in the case of Scotland scoring a goal. IMF' was 4: 1 from 0–0 to 1–0 (Croatia qualifying as third); 1 from 0–1 to 1–1 (both teams eliminated); 1 from 1–1 to 2–1 (Croatia qualifying as third); and 1 from 2–1 to 3–1 (Croatia qualifying as second).

Competition and game fairness

In this study, fairness is assessed at different levels, i.e. competition fairness (CF) and game fairness (GF). At the competition level, two indicators are considered. Consistent with Csató (2020, 2021), we built CF indicator 1 (CF1) to assess whether a group winner in the UNL faced stronger opponents in the Euro qualifying play-offs than a non-group winner from the same league despite having performed better in the UNL. Besides, there is a need to assess whether the best teams on the pitch, in terms of ranking and performance, successfully qualified for the competition. With CF2, we aim to identify whether there are clear examples of teams qualifying rather than others due to the competition format, while the former teams were beaten by or lower ranked than the latter teams over the period studied. The focus is more specifically on the impact of the 2018–19 UNL on the teams qualifying for Euro 2020, assuming that the previous format was fair.

At the game level, four indicators are considered before being aggregated for each of the two periods analysed so that they can be compared. First, consistent with Haugen and Krumer (2021), home advantage can affect fairness. Particular attention will be paid to the finals in the Euro 2020 qualifying play-offs (home advantage based on a draw rather than better ranking) and Euro 2020. In other words, there is a need to list games where home advantage was based on a draw and/or multiple hosts of the final tournament (Euro 2020) rather than better ranking or single host of the final tournament like France in 2016 (GF1). Second, also in line with Haugen and Krumer (2021), there is a need to list games where a team has an incentive to lose (GF2). Third, there are other aspects that need to be considered, e.g. whether both teams are still in contention, which is supposed to guarantee fairness as both teams are expected to play their best; or whether it is the case for one team only, which may jeopardise fairness. Games corresponding to the second situation need to be listed (GF3). Fourth, friendly and knockout phase/play-offs games are not considered to be

potentially unfair, since teams have similar incentives to play their best in knockout phase/play-offs games, or not play their best in a friendly game but this does not impact – i.e. cannot be unfair to – any other team not involved in the friendly game. One may think that the same principle as for friendly games should automatically apply to competitive games where both teams are not in contention anymore. However, such competitive games may affect other teams not involved in these games, see the results section for an illustration. Thus, they also need to be listed (GF4).

All the games identified by GF indicators (i.e. GF1 to GF4) raise potential unfairness concerns ex-ante (i.e. before the game is played). Therefore, an evaluation is conducted to determine whether these concerns may have affected the outcome and any team not involved in the game, based on the actual outcome and whether they align with expectations (assumed to be fair) or not (potentially unfair). In essence, the study investigates both the games that potentially raised fairness concerns ex-ante and those that may have had fairness issues ex post (i.e. after the game was played). For example, the better ranked team was not in contention anymore, the lower ranked team was still in contention and did better than expected, e.g. a win while not playing home (away or neutral); or the lower ranked team was not in contention anymore, the better ranked team was still in contention and in need to win with a large goal difference, and such goal difference was larger than expected. This analysis assesses whether these situations resulted from a fair competition between teams where both played their best.

Determinants of CB

This study assesses the determinants of CB in sport competition. We acknowledge that our hypotheses focus on making comparisons rather than establishing causation. Nevertheless, it is essential to examine the potential causal factors underlying the hypotheses. Therefore, four regressions were conducted to explain the goal difference at the end of each game, drawing on determinants identified in the conceptual foundation. In all four regressions, the primary determinant is the difference in populations (expressed in natural logarithms, ln). The first regression introduces additional determinants that include variables with values of 1, 0 or −1 to capture the specific competitions, editions and leagues. These variables encompass distinctions such as UEFA Nations League (UNL) leagues A, B, C and D, Euro qualifiers in 2016 vs. 2020, Euro 2016 vs. 2020, friendly games in 2014–16 vs. 2018–20. The purpose of these variables is to discern whether UNL League D exhibits lower CB, which can be attributed to higher differences in ln(population) compared to other UNL leagues, aligning with H1.1. These regressions also investigate whether Euro qualifiers in 2020 show a higher coefficient, indicating lower CB compared to Euro qualifiers in 2016, aligning with H2.1.

Alternatively to the aforementioned variables taking the value 1, 0 or −1, other variables taking the same values and capturing the cycle effect are tested in the second regression, i.e. highest population in 2014–16 vs. 2018–20. This approach aims to confirm if CB has deteriorated, signalled by a higher coefficient for 2018–20, in line with H2.1. Besides, the last two regressions incorporate variables with values 1, 0 or −1 to capture the incentive associated with the game, i.e. highest population when both teams in contention vs. only the highest ranked team in contention vs. only the lowest ranked team in contention vs. highest population or the team already qualified if the other team is already eliminated when no team in contention vs. friendly game. Any difference in the coefficients between these incentive-related variables will reveal how incentives affect CB and therefore fairness, offering insights in relation to H2.1 and H3.2. Any difference in the coefficients of the competition/edition/league variables (regressions 1 vs. 3) and cycle variables (regressions 2 vs. 4) will also inform H2.1 by revealing to what extent the initial differences (regressions 1 and 2) are due to competition format and subsequent incentives.

Furthermore, all regressions include variables accounting for home advantage, differentiating between home advantage with fans and home advantage without fans due to COVID-19 restrictions or UEFA sanctions. This differentiation is important as it pertains to H3.2, examining the effect of

Table 2. Number and percentage of games between UEFA men's national teams analysed in the 2014–16 and 2018–20 cycles.

	2014–16		2018–20	
	Number	Percentage	Number	Percentage
Euro qualifying	266	52.9%	262	47.2%
Euro	51	10.1%	51	9.2%
UNL	-	-	142	25.6%
Overall/competitive games only	**317**	**63.0%**	**455**	**82.0%**
Friendly games	186	37.0%	100	18.0%
Overall/competitive and friendly games	**503**	**100%**	**555**	**100%**

home advantage on fairness. Lastly, a variable considering the impact of an increase in the number of substitutions allowed during the Euro 2020 qualifying playoffs and the final tournament is included in all regressions. This variable addresses how rule changes may influence fairness and proves valuable information regarding H3.2.

In summary, the regression analyses employ a range of variables to assess the determinants of CB and fairness in European men's national team football. The inclusion of these diverse determinants enables a comprehensive evaluation of the factors influencing these key aspects of the sport.

Data collection

Four websites were consulted for data collection: UEFA (UEFA competitions), EU Football and Eurosport (friendly games), and United Nations (population).[3] Overall, 1,058 games were analysed. For the period covering August 2014-July 2016 (2014–16 cycle), 503 games between European men's football national teams were analysed: 266 Euro qualifying games, 51 Euro games and 186 friendly games. For the periods August 2018-July 2020 and May-July 2021 (2018–20 cycle), 555 games were analysed: 262 Euro qualifying games, 51 Euro games, 142 UNL games and 100 friendly games. Table 2 summarises this information.

Data analysis

The study employed regressions to establish causation. Independent t-tests compared the two study periods (one-tailed as specific directions are expected for the evolutions, i.e. decrease for IMCB and increase for IMCI). One-way ANOVAs examined differences between the four UNL leagues (one-tailed for postestimation Bonferroni tests involving League D as specific directions are expected, i.e. lower IMCB and IMCI in League D; two-tailed otherwise). Normality tests were not conducted because nonparametric tests were not considered, as they assume the mean rank is more appropriate than the mean, however they would not provide any useful descriptive statistics, besides our samples are large enough to conduct parametric tests (Lumley *et al*. 2002). The software Stata/MP 18.0 was utilised for data analysis.

Results

Regressions

Table 3 offers descriptive statistics for the variables used in the regressions. Table 4 presents the regressions results, all robust to heteroscedasticity. As expected, the difference in ln populations has a significant and positive impact on goal difference (negative impact on CB). In regressions 1 and 3, UNL League D exhibits lower coefficients compared to other UNL leagues, despite having a higher average goal difference (1.73 vs. 1.17 to 1.39 for the other UNL

Table 3. Descriptive statistics (based on absolute values).

	Mean	Standard deviation	Minimum	Maximum	Median
Goal difference	1.66	1.55	0	10	1
Difference in ln populations	2.03	1.63	0.004	8.33	1.67
UNL League A	0.03	0.16			
UNL League B	0.02	0.15			
UNL League C	0.04	0.20			
UNL League D	0.05	0.21			
Euro 2016 qualifying	0.25	0.43			
Euro 2020 qualifying	0.25	0.43			
Euro 2016	0.05	0.21			
Euro 2020	0.05	0.21			
Friendly 2014–16	0.18	0.38			
Friendly 2018–20	0.09	0.29			
2014–16	0.48	0.50			
2018–20	0.52	0.50			
Both teams in contention	0.61	0.49			
Highest ranked team in contention	0.08	0.27			
Lowest ranked team in contention	0.01	0.10			
No team in contention	0.03	0.18			
Friendly	0.27	0.44			
Home advantage with fans	0.86	0.35			
Home advantage without fans	0.04	0.19			
Additional substitutions	0.06	0.24			

leagues). This aligns with H1.1 that lower CB in UNL League D is due to higher population differences. Euro 2020 qualifying has a higher coefficient than Euro 2016 qualifying, supporting the rationale for H2.1 and confirming the expected deterioration of CB in Euro qualifiers, substantiated by a higher average goal difference in Euro 2020 qualifiers (2.11 vs. 1.69 for Euro 2016 qualifiers). Euro 2016 has a higher coefficient than Euro 2020 and is significant while Euro 2020 is not. A tentative explanation would be that the Video Assistant Referee (VAR), only applied during Euro 2020 in the games analysed, has a positive impact on CB.

In regressions 2 and 4, the coefficient for 2018–20 is higher than 2014–16, corroborating H2.1 regarding CB deterioration. This is further validated by a higher average goal difference in 2018–20 (1.76 vs. 1.55 for 2014–16). The differences in coefficients between Euro 2016 and 2020 qualifying and between 2014–16 and 2018–20 are also lower in regressions 3 (compared to 1, reduced from 0.54 to 0.49) and 4 (compared to 2, reduced from 0.32 to 0.26) when controlling for the incentive variables, thus highlighting the role of incentives in CB deterioration and their potential to impact fairness, in line with H2.1 and H3.2. The highest-ranked team benefits when it is the only team in contention, consistent with expectations. By contrast, the lowest-ranked team does not gain an advantage when it is the only team in contention. In all regressions, both home advantage variables also exhibit significant positive coefficients, confirming the potential of home advantage to impact fairness, in line with H3.2. This is particularly the case without fans, in contrast to recent literature (see review by Leitner *et al*. 2023). Conversely, additional substitutions significantly reduce goal difference (positive impact on CB), which means they may have made games fairer, opposite to H3.2.

Intra-match CB

Table 5 displays the results for IMCB in UEFA men's national team games during the 2014–16 and 2018–20 cycles. In the UNL, although IMCB in League D was lower than in other leagues (except its IMF compared to League B), none of these differences were significant (H1.1 rejected). The overall IMU significantly decreased, confirming H2.1. This decline primarily stemmed from Euro qualifying. Among the 53 countries participating in both editions, almost 70% (37) experienced reduced IMU, with notable decreases for Latvia (−34% points), Belgium

Table 4. Regression results.

	Regression 1, league effect without incentive variables	Regression 2, cycle effect without incentive variables	Regression 3, league effect with incentive variables	Regression 4, cycle effect with incentive variables	Alignment with hypotheses
Difference in ln populations	0.53***	0.57***	0.51***	0.54***	H1.1
	(0.04)	(0.04)	(0.04)	(0.04)	
UNL League A	−0.40		−0.18		H1.1 and H2.1
	(0.33)		(0.36)		
UNL League B	−0.37		−0.18		
	(0.31)		(0.34)		
UNL League C	−0.12		−0.05		
	(0.22)		(0.26)		
UNL League D	−0.54*		−0.37		
	(0.31)		(0.32)		
Euro 2016 qualifying	−0.25*		−0.09		H2.1
	(0.13)		(0.18)		
Euro 2020 qualifying	0.29*		0.40**		
	(0.16)		(0.19)		
Euro 2016	0.44*		0.43*		
	(0.25)		(0.24)		
Euro 2020	0.24		0.36		
	(0.47)		(0.48)		
Friendly 2014–16	−0.36***		−0.33**		
	(0.14)		(0.14)		
Friendly 2018–20	−0.26		−0.22		
	(0.18)		(0.18)		
2014–16		−0.40***		−0.35*	
		(0.10)		(0.20)	
2018–20		−0.08		−0.09	
		(0.11)		(0.20)	
Both teams in contention			−0.19	0.02	H2.1 and H3.2
			(0.16)	(0.19)	
Highest ranked team in contention			0.79***	0.94***	
			(0.21)	(0.21)	
Lowest ranked team in contention			−0.34	−0.36	
			(0.38)	(0.39)	
No team in contention			−0.04	0.19	
			(0.34)	(0.34)	
Friendly				−0.06	
				(0.21)	
Home advantage with fans	0.67***	0.61***	0.67***	0.62***	H3.2
	(0.17)	(0.17)	(0.17)	(0.17)	
Home advantage without fans	1.02***	0.90***	1.00***	0.92***	
	(0.29)	(0.28)	(0.29)	(0.29)	
Additional substitutions	−0.77**	−0.49**	−0.66*	−0.44*	
	(0.38)	(0.24)	(0.38)	(0.24)	
Constant	−0.25	−0.21	−0.25	−0.21	
	(0.16)	(0.16)	(0.16)	(0.16)	
Observations		1058			
R^2	0.36	0.35	0.38	0.37	

The dependent variable is goal difference at the end of the match in all models. *, ** and *** mean significant at the 10%, 5% and 1% levels, respectively. All regressions are robust to heteroscedasticity. Robust standard errors in brackets.

(−34), Italy (−29) and Faroe Islands (−24). These examples may illustrate cases where top teams had stronger incentives to perform at their best (Belgium and Italy), while other teams had diminished incentives (Latvia and Faroe Islands) due to lower qualification prospects. By contrast, some countries encountered high increases in IMU, with Gibraltar (+27% points), Luxembourg (+21) and Andorra (+19) leading the way.

Table 5. IMCB in games between UEFA men's national teams in the 2014–16 and 2018–20 cycles.

	2014–16		2018–20	
	IMU	IMF	IMU	IMF
Euro qualifying	81.3%	1.50	74.2%***	1.54
Euro	90.8%	1.47	87.6%	1.63
UNL	-	-	84.5%	1.46
League A	-	-	*84.3%*	*1.71*
League B	-	-	*89.2%*	*1.25*
League C	-	-	*87.4%*	*1.57*
League D	-	-	*79.6%*	*1.31*
Overall/competitive games only	**82.8%**	**1.50**	**78.9%****	**1.52**
Friendly games	82.8%	1.45	82.1%	1.34
Overall/competitive and friendly games	**82.8%**	**1.48**	**79.5%****	**1.49**
Observations	503		555	

The table addresses hypotheses H1.1 and H2.1. ** and *** mean significant difference compared to the previous edition at the 5% and 1% levels, respectively.

Table 6. IMCI in games between UEFA men's national teams in the 2014–16 and 2018–20 cycles.

	2014–16		2018–20	
	IMU′	IMF′	IMU′	IMF′
Euro qualifying	75.1%	1.30	68.4%**	1.37
Euro	90.5%	1.33	88.3%	1.61
UNL	-	-	80.9%	1.32
League A	-	-	*84.2%***	*1.68***
League B	-	-	*89.2%****	*1.17*
League C	-	-	*88.0%****	*1.48*
League D	-	-	*68.7%*	*1.04*
Overall/competitive games only	**77.6%**	**1.30**	**74.5%***	**1.38**
Friendly games	0%	0	0%	0
Overall/competitive and friendly games	**48.9%**	**0.82**	**61.1%****	**1.13****
Observations	503		555	

The table addresses hypotheses H1.2 and H2.2. For the results not specific to the UNL, *, ** and *** mean significant difference compared to the previous edition at the 10%, 5% and 1% levels, respectively; for the results specific to the UNL, they mean significantly higher than League D.

Intra-match CI

Table 6 presents the results for IMCI in UEFA men's national team games during the 2014–16 and 2018–20 cycles. In the UNL, the absence of relegation spots and incentives associated with Euro qualifying pots in League D, coupled with its lower IMCB, led to significantly lower IMCI in League D compared to higher tiers, in accordance with H1.2. The overall IMU′ and IMF′, excluding friendly games, significantly decreased. However, when friendly games were included, both IMU′ and IMF′ experienced a significant increase, aligning with H2.2. The UNL's transition from friendly to competitive games effectively compensated for the IMU′ decrease in Euro qualifying.

Fairness at competition level

In assessing the fairness of the teams faced by the 2018–19 UNL group winners vs. non-group winners from the same league (a situation encountered only in League C) in the Euro qualifying play-offs (CF1), we can examine the average ranking of their (potential) opponents. This method suggests fairness, as lower-ranked teams faced tougher schedules. For example, paths from the 25th (Scotland) to 32nd (Romania) ranked opponents demonstrates increasing difficulty: 28.25 > 27.25 > 26.75 > 26.5 > 25.75 > 25.5 > 21.25, with > meaning 'easier than' since a higher number means a lower ranking of the opponents.

To evaluate the fairness of the teams qualifying for Euro 2020 – i.e. whether the best teams on the pitch in the qualifiers took part (CF2) – we compare teams potentially qualifying with and without the UNL. Without the UNL, the eight best third-ranked teams in Euro 2020 qualifying (ranks from 21st to 28th) were expected to participate in the play-offs. These eight teams were Serbia, Slovakia, Republic of Ireland, Iceland, Northern Ireland, Norway, Kosovo, and Greece. Out of these eight teams, seven took part in the play-offs (Greece being the exception), yet only one (Slovakia) qualified for Euro 2020. The three other teams that qualified for Euro 2020 were the teams ranked just after the eight aforementioned teams in the Euro 2020 qualifying overall ranking, i.e. Scotland (29th), North Macedonia (30th) and Hungary (31st).

Notably, Hungary, despite finishing fourth in Group E, would have ranked 26th based on points alone. North Macedonia faced strong competition in their group, including Slovenia – second best fourth-ranked team – and Israel – second best fifth-ranked team. This suggests that North Macedonia may have faced a fiercer competition to gain points than some other third-ranked teams. Moreover, in the playoffs, Scotland won against Serbia (21st) away; North Macedonia won against Kosovo (27th); and Hungary won against Iceland (24th). In other words, each of the three teams were able to qualify against a team ranked between the 21st and 28th positions in the Euro qualifying overall ranking, with Scotland even able to qualify against Serbia (best third-ranked team) away. To some extent, it could be argued that the 2018–19 UNL determining the teams taking part in the Euro 2020 qualifying play-offs enabled to compensate the potential unfairness of teams being drawn in groups with differing levels of difficulty in Euro 2020 qualifying. Thus, no fairness issue is identified in terms of the teams that qualified for Euro 2020 and more generally at the competition level (H3.1 rejected).

Fairness at game level

In terms of home advantage (GF1), we can assess its fairness in different contexts. For example, in the finals of the Euro 2020 qualifying play-offs, one may question whether it was fair that Hungary (31st in the UNL overall ranking) played home against Iceland (12th). The latter lost all its games in its UNL group, but it was in League A which is more challenging than any other league. Hungary won against Iceland; one may argue that the outcome could have been different if Iceland would have been granted home advantage based on its better ranking (outcome potentially unfair). One may also question whether it was fair that Northern Ireland (24th) played home against Slovakia (21st). However, Slovakia won, making it a fair result. In the other two finals, the best-ranked teams played at home, thus ensuring fairness.

In the Euro 2020 group stage, four of the six teams from Pot A played all their games at home (Italy, England, Spain, and Germany), while Belgium and Ukraine faced some away matches, representing two exceptions. Belgium won both their away games (no unfair outcome resulting from the situation), and Ukraine lost. However, they also lost against Austria from Pot C and still qualified. For a better ranking in their group, they would have needed to win against the Netherlands, an outcome far from obvious even without home advantage for the Netherlands (no unfair outcome). Two teams had home advantage in two games despite being from Pot D: Hungary and Scotland. Both teams were eliminated at the end of the group stage, while all their opponents qualify for the round of 16 (no unfair outcome). The only potential case of home advantage affecting the qualification of the lower ranked team and the elimination of the higher ranked team was Denmark-Russia. Denmark (lower ranked team) won home and qualified, while Russia (higher ranked team) was eliminated (potentially unfair outcome). In addition to the group stage games, one more game where the lower ranked team in Euro qualifying had home advantage was the final between England and Italy. England (lower ranked team) played home, however Italy won (no unfair outcome).

Regarding teams having an incentive to lose (GF2), the only potential case identified was the same as Haugen and Krumer (2021), i.e. Israel before its seventh game in Euro qualifying in Austria. Haugen and Krumer (2021) find reasonable to suspect that Israel was unlikely to qualify from the

Table 7. Fairness indicators in games between UEFA men's national teams in the 2014–16 and 2018–20 cycles.

	2014–16		2018–20	
	Games raising potential unfairness ex-ante	Games raising potential unfairness ex-post	Games raising potential unfairness ex-ante	Games raising potential unfairness ex-post
Euro qualifying	39 (14.7%) 38 with only one team in contention (GF3); 1 with no team in contention (GF4)	2 (0.8%; Turkey and Kazakhstan winning in Czech Republic and Latvia, respectively)	42 (16.0%) 2 home advantage (GF1); 1 incentive to lose (GF2); 39 with only one team in contention (GF3)	1 (0.4%; Iceland losing in Hungary in the play-offs final)
Euro	2 (3.9%) 2 with only one team in contention (GF3)	1 (2.0%; Republic of Ireland winning against Italy)	9 (15.7%) 8 home advantage (GF1); 1 with only one team in contention (GF3)	1 (2.0%; Russia losing in Denmark)
UNL	-	-	15 (10.6%) 15 with only one team in contention (GF3)	0
League A	-	-	*1 (4.2%)*	*0*
League B	-	-	*1 (4.2%)*	*0*
League C	-	-	*6 (14.3%)*	*0*
League D	-	-	*7 (14.6%)*	*0*
Overall/ competitive games only	**41 (12.9%)**	**3 (0.9%)**	**63 (13.8%)**	**2 (0.4%)**
Friendly games	0	0	0	0
Overall/ competitive and friendly games	**41 (8.2%)**	**3 (0.6%)**	**63 (11.4%)**	**2 (0.4%)**
Observations		503		555

The table addresses hypothesis H3.2.

'usual' qualification then, however they were still in contention, so we argue that they had no incentive to lose.

For games with only one team still in contention (GF3), 93 cases were identified. In most games, the better-ranked team was still in contention, and the final score/goal difference did not raise fairness issues. Two exceptions were Czech Republic-Turkey in Euro 2016 qualifying and Italy-Republic of Ireland in Euro 2016, with the lower ranked teams (Turkey and Republic of Ireland, respectively) being still in contention and winning against the better ranked teams who were already qualified.

In games with none of the two teams still in contention but the outcome affecting other teams not involved (GF4), only one case was found: Latvia-Kazakhstan in Euro 2016 qualifying, with the lower ranked team (Kazakhstan) winning the game.

Table 7 summarises fairness indicators in games between UEFA men's national teams in the 2014–16 and 2018–20 cycles. Overall, only five out of 1,058 games analysed (0.5%) raised potential unfairness based on actual outcomes, with three cases in the 2014–16 cycle and two in the 2018–20 cycle despite more games than the 2014–16 cycle and only competitive games prone to potential unfairness while the 2014–16 cycle included friendly games. Therefore, H3.2 (decrease in fairness at the game level) is rejected.

Discussion and conclusion

Main findings and contribution to knowledge

This article advances knowledge of CB, CI, and fairness in sports contests. First, it adds insights onto a limited body of prior research that has investigated CB and CI within national football team competitions, within the broader context of the Analysis of Competitive Balance literature. In the context of the establishment of the UNL in European men's national team football, the present research shows that CB deteriorated. This decline is attributed to varying incentives to play their best for the strongest (weakest) teams during Euro qualifying matches. However, it is noteworthy that some of the traditionally weakest teams, including Andorra, Gibraltar, and Luxembourg, exhibited improvements in the CB of their games. Our assumption that the four-year gap between the two periods might not yield significant developments in football across countries holds true in most cases. Yet, these three aforementioned countries, which have limited experience in men's football in Europe, as evident from their historical game records, may represent exceptions. This suggests that even a relatively short four-year interval can facilitate substantial development in men's football for these countries, aligning with the Gould hypothesis. This might be due to these countries presenting greater room for development compared to more experienced football nations.

More specifically about the 2018–19 UNL, our results show that CB and CI were lower in League D compared to the other leagues. It is important to note that these differences reached statistical significance only for CI. This outcome aligns with our expectations due to the considerable disparities in population within League D. As such, this reiterates that disparities in talent pools (market sizes) across countries fundamentally affect CB and CI, in line with prior research (Fort and Quirk 1995). In contrast to the overall decrease in CB, our findings demonstrate substantial improvement in CI, primarily attributable to the UNL replacing friendly matches. This aligns with the earlier discussions by Scelles (2021a), which anticipated this positive shift even before empirical data became available to confirm it. As such, the UNL emerges as a key driver in promoting football in Europe, contributing significantly to UEFA's strategic goals. It is important to acknowledge that this result was predictable due to the lack of CI in friendly games. However, our study evidences the extent of the improvement in CI within European men's national team football, with the IMU indicator moving from less than 50% to more than 60%.

While recent literature has raised potential fairness issues due to the establishment of the UNL (Csató 2020, 2021, 2022, Haugen and Krumer 2021), our study provides robust empirical evidence that the UNL did not compromise the integrity of national men's football team competitions and games in Europe. This assessment was based on six key indicators, encompassing two at the competition level and four at the game level. These indicators have the potential for application in diverse sporting contexts to evaluate the fairness of competitions and games. By bringing CB, CI, and fairness together, this study sheds light on the ability of sport organisations, particularly federations, to both promote and develop their sport, while also preserving integrity. Additionally, it contributes to theoretical development through the complementary use of different concepts in the same study.

Policy implications

The format introduced by UEFA for the 2018–19 UNL carries significant policy implications for its member associations. This format ensured that at least one team from League C and one team from League D would qualify for Euro, a decision that holds both positive and potentially adverse consequences. On the positive front, UEFA's approach can be viewed as a step towards football development and promotion in countries from Leagues C and D, which might have struggled to qualify in the past. UEFA effectively incentivised these teams to strive for excellence. This aligns with the 'competitiveness' pillar of UEFA's strategy, which emphasises enhancing the overall competitive landscape of European football. In addition, this move has broader implications, as it sets an example for other sports governing bodies to consider similar policies in their respective sports. Encouraging

underrepresented teams and associations can inspire youth players, ultimately nurturing talent from various corners of the sport. However, it must be acknowledged that the new format introduced by UEFA can be seen as unfair by teams not qualifying for Euro that may be of higher sporting standard than teams from Leagues C and/or D qualifying for the final tournament. This discrepancy could undermine the integrity of the competition, as it may lead to accusations of imbalance and bias in the qualification process. As raised by Csató (2021), this format might inadvertently create a situation where teams seek to be relegated to a lower league once they realise their qualification prospects are dim. This decision would potentially allow these nations to compete against teams of ostensibly lower sporting standard, thus increasing their chances of success in the future.

UEFA's experience with the UNL format serves as a valuable lesson for all sports governing bodies considering similar policies aimed at incentivising lower-ranked national associations. Such decisions should be carefully weighted in terms of their potential impact on fairness and integrity of competitions. The measures introduced should be subjected to thorough assessment, as exemplified in this study, to ascertain that improvements in competitiveness do not compromise the trust pillar of their strategic objectives. Maintaining the balance between fostering competitiveness and preserving trust is essential for the long-term health and sustainability of any sport. By finding this balance, sports organisations can continue to promote fair and exciting competitions while offering opportunities for underrepresented teams to flourish and inspire the next generation of athletes.

Limitations and research directions

While our study has made significant contributions to understanding CB, CI, and fairness in European men's national team football, it is important to acknowledge its limitations and identify potential avenues for future research. First, despite achieving a CI rate of over 60% during the specified period, it is worth noting that there may still be room for improvement towards the ideal 100% CI. A straightforward approach to achieving this would be to further reduce the number of friendly games. However, it is essential to recognise that friendly games serve as a platform for head coaches to experiment with new players and tactics. Therefore, the CI approach, which places substantial negative weight on friendly games, may need to be reconsidered to account for the benefits they provide. Future research could involve interviews with stakeholders (e.g. head coaches) to grasp their perceptions about the pros and cons of competitive vs. friendly games. Moreover, although our study found that fairness did not decrease over time, the objective for a sport organisation should be to eliminate any game that raises potential unfairness ex-ante. As indicated in Table 7, more than 10% of the competitive games played during the study periods had the potential for unfairness ex-ante. More research is required around optimal competition formats providing 'right' incentives for all teams in all games, following the line of studies conducted recently by Csató.

Unfairness might exist even when the outcome looks fair. To address this, future research could explore the development of additional fairness indicators, including statistical methods to detect match-fixing, which is becoming an increasingly significant threat to the integrity of sports (Forrest and McHale 2019). Another direction would be to investigate whether the UNL is a way for smaller countries to attract talent to their countries or domestic leagues indirectly, in line with the idea of global search for talent outlined in the CB literature (Schmidt and Berri 2003). This point could be true for smaller countries having many players with multiple citizenships.

In conclusion, while we acknowledge the limitations of the current article, we believe it represents a valuable contribution to knowledge by consolidating our understanding of CB, CI, and fairness as indicators of sport promotion, development, and integrity. The policy implications derived from our findings are essential for sports managers and policymakers. Future research in this domain will play a crucial role in defining these indicators, uncovering new insights, and advancing knowledge of how sports organisations can effectively balance competitiveness, integrity, and fairness.

Notes

1. Coefficient of variation = 0.158 in League D vs. 0.090 in League A, 0.079 in League B and 0.063 in League C.
2. Depending on the impact of the overall goal difference in the table for both teams.
3. Office for National Statistics for UK nations and Geoba for Kosovo, not available from United Nations.

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