Original Article

How the value of football players influences a team's chances of victory – a Euro 2020 example

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Abstract:
Problem Statement: one of the things that ignites the interest of football fans all over the world is the financial value of players. The proper valuation of players is also an important issue that influences the management process of football clubs. It is believed that a player's value should be related to his productivity. Consequently, it seems that a team with a greater overall combined player value should usually be more successful than a team with a lesser value. Therefore, an examination of this assumption was performed on the results of the 2020 UEFA European Football Championship (Euro 2020). Approach: In the beginning, the value of all 620 players registered at this tournament was collected. The next step was a calculation of the total value of each national team's squad and an examination of the final teams' achievements in this tournament. Purpose: The article aims to analyse if a squad's value was a reliable indicator of its results during Euro 2020. The article also presents which players at Euro 2020 were the most valuable and describes some of the factors that may affect their performances. Additionally, the article presents an analysis of other factors that may be associated with a team's achievements, such as origin-country population, GDP per capita, as well as UEFA and FIFA ranking. Results: The average value of players at the tournament was 16.84 million EUR and England was the most valuable team. The study showed that the team's value strongly negatively correlates with its final position, while there is no significant correlation in the case of the country's population and GDP per capita. In turn, taking into account the official rankings of national teams, a higher significant correlation was noted in the case of its FIFA ranking. Conclusions: The results show that the value of a team is an important factor that partly explains its results, but there are also other factors that may lead to victory or defeat.
Key Words: football, player value, Euro 2020, finances in sport.

Introduction

The budgets of the best football clubs are continually growing, and the value of the best players is also increasing (Majewski, 2021; Poli et al., 2019). Due to this increasing amount of money, the sport has become an important part of the global economy (Klobučník et al., 2019). Since 2016, the aggregate enterprise value of the top 32 European football clubs has grown by 51% (KPMG, 2020). Only in 2020, was there a slowdown in both club spending and revenues due to the COVID-19 pandemic (Metelski & Kornakov, 2021). The European Club Association (ECA, 2020) estimated the losses of European football clubs related to COVID-19 at approximately 3.6 billion EUR. Current market conditions force football clubs to implement effective financial management (Pawłowski, 2020). In 2021, the highest valued football clubs were Real Madrid 1.27 billion EUR, FC Barcelona 1.26 billion EUR, Manchester United 1.13 billion EUR, Manchester City 1.27 billion EUR, and Bayern Munich 1.17 billion EUR (Garcia, 2021). Moreover, the market potential of football is evidenced by the fact that in 2018 the final of the World Cup was watched by over a billion viewers (FIFA, 2018). Other football tournaments are also very popular. The final of the last European Championship between England and Italy was watched by 31 million people in England (population 56.27 million), notably it was the highest TV audience since the funeral of Diana, Princess of Wales, in 1997 (BBC, 2021). In total, Euro 2020 matches were shown in over 200 territories around the world, with an estimated total live event audience of 4.7 billion (UEFA, 2021). Perhaps, the most fundamental aspect of professional football is competition, an aspect that makes it so attractive and financially successful (Pawlowski et al., 2010). This can also be understood as uncertainty of outcome – a term used in economics but which also has implications for both financial and sporting performance in professional team sports (Plumley et al., 2017).

Obtaining an accurate economic value of football players is highly desirable because it allows, to some extent, the valuation of a club, budget planning, and remuneration (He et al., 2015). That is why assessing the value of football players and determining whether they should be transferred from one club to another has become a major challenge for the managers of clubs (Herm et al., 2014). Many scientists have also tried to determine which factors have the greatest impact on the value of players (Felipe et al., 2020; Kiefer, 2014;

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Majewski, 2016; Metelski, 2021; Post, 2018; Tunaru et al., 2005). It is widely believed that there is a strong positive correlation between transfer fees and productivity (Majewski, 2016; Ruijg & van Ophem, 2015). However, it should be added that in a team sport like football, it is quite hard to judge an individual player's performance and thus his exact value. Even though it is relatively difficult to estimate the exact value of players, in recent years their values have generally been increasing, as evidenced by, among other things, several spectacular transfers. In the history of football, 10 transfers have been made for at least 100 million EUR, including the highest one for 220 million EUR (Neymar to Paris SG in 2017). Interestingly, all of these transfers have been made in the last 7 years (Transfermarkt, 2020). In 2019, the amount of money spent by football clubs on transfers exceeded 10 billion EUR for the first time (Poli et al., 2020). This amount has more than tripled in the last decade, in line with the growth of club revenues.

The article focuses on one of the largest football tournaments – Euro 2020. The European Championship, formally UEFA European Championship, also called Euro, is a quadrennial tournament held between the member countries of the Union of European Football Associations (UEFA) (Britannica, 2021). The European Championship is second in prestige only to the World Cup among international football tournaments. The two most successful nations in the tournament's history are Germany and Spain, who hold three titles each (Football History, 2021). Euro 2020 was originally supposed to be played in 2020, but due to COVID-19, it was postponed to 2021. Euro 2020 was held across Europe for the first time in the competition's history. The following cities hosted the games: London (England), Saint Petersburg (Russia), Baku (Azerbaijan), Munich (Germany), Rome (Italy), Amsterdam (Netherlands), Bucharest (Romania), Budapest (Hungary), Copenhagen (Denmark), Glasgow (Scotland), and Seville (Spain). Euro 2020 started on 11 June and ended on 11 July and 24 national teams took part in it. The format was the same as for Euro 2016; the top two in each of the six final tournament groups proceeded to the round of 16 along with the four best third-placed finishers (UEFA, 2021b). Then, the quarter-finals, semi-finals and the final were played in a cup system.

Football is particularly susceptible to unpredictability (Mackenzie & Cushion, 2013). Player performance and consequently team performance is dependent on many factors, including match importance, score, location, opposition, number of recovery days, and the employed tactical system (Paul et al., 2015). As stated before, uncertainty about the outcome of the match is something that makes sport very attractive (Pawlowski et al., 2010). However, it is worth considering what factors make some teams successful and others not. This article focuses on player value as one of the factors that may affect a team's success. In addition, it was decided to check the population of a country, because it seems that the more people live in a given country, the greater the chance that there will be born and brought up exceptional talents. Attention was also paid to GDP per capita, because richer countries are able to invest more money in to the development of sport. The study also checked how appropriate are UEFA and FIFA rankings. The article aims to analyze if a squad's value and few additional factors (population, GDP per capita, UEFA and FIFA ranking) correlate with its results.

Material & methods
Procedure
The data on player transfer fees was collected from transfermarkt.de. Transfermarkt.de is a German-based website that compiles football information, such as scores, results, statistics, transfer news, and fixtures. Transfermarkt.de is also a good open-source platform of information about player values and transfer fees.

The study consisted of collecting data on the individual value of the 620 players of all 24 teams that played in Euro 2020. The next step was to calculate the total value of each national team squad. The team at Euro 2020 could end the tournament as follows: be a winner, finalist, semi-finalist, quarter-finalist, advance from the group, or be eliminated in the group stage. Based on the above-mentioned tournament ends of a given team, its place in the tournament was determined.

Statistical analysis
Descriptive statistics and statistical tests (Pearson's correlation coefficient) were used in the study. Microsoft Excel and IBM SPSS Statistics 26 were both used to process the quantitative data of the research. The study took into account the individual values of players, the total value of each of the 24 national teams that played at Euro 2020, as well as the populations of countries, their GDP per capita and their places in the UEFA and FIFA rankings.

Results
In total, 620 players entered the tournament. Their average value was 16.84 million EUR, and their total value was 10,480.83 million EUR. During Euro 2020, 16 players from one team could play in one match (11 in the first team plus 5 substitutions). Table 1 presents the 16 most valuable players at Euro 2020. The table contains information such as the player's name, value, and additional data, which may also affect their value, such as nationality, club, position, and age.

Table 1. Top valued players at Euro 2020

Name	National team	Position	Club	Age	Player value (mln EUR)
Kylian Mbappé	France	FWD	PSG	22	160
Harry Kane	England	FWD	Spurs	28	120
Kevin De Bruyne	Belgium	MID	Man City	30	100
Romelu Lukaku	Belgium	FWD	Inter	28	100
Jadon Sancho	England	MID	BVB	21	100
Raheem Sterling	England	FWD	Man City	26	90
Joshua Kimmich	Germany	MID	Bayern Munich	26	90
Frenkie de Jong	Netherlands	MID	Barcelona	24	90
Bruno Fernandes	Portugal	MID	Man Utd	26	90
Marcus Rashford	England	FWD	Man Utd	23	85
Phil Foden	England	MID	Man City	21	80
João Félix	Portugal	FWD	Atletico Madrid	21	80
Marcos Llorente	Spain	MID	Atletico Madrid	26	80
Mason Mount	England	MID	Chelsea	22	75
Matthijs de Ligt	Netherlands	DEF	Juventus	22	75
Rúben Dias	Portugal	DEF	Man City	24	75

It is worth noting that among the 16 highest-valued players presented above, there are as many as 6 representatives of England. There are also 8 midfielders, and interestingly no goalkeepers. The responsibilities of each position in football (goalkeeper, defender, midfielder, and forward) are different, and usually for example, forward players are more visible to the audience, simply because football is goal-oriented. In addition, the highest-valued players play in English Premier League clubs and as many as 4 in Manchester City. This is probably because the English Premier League is the highest-rated football league in the world (UEFA, 2021a), and local clubs there spend very large sums of money on player transfers (Poli et al., 2019). Finally, the average age of the top 16 was 24.37. Age is one of the most important factors that affects a player's market value, as it acts as a proxy for experience and potential (Carmichael & Thomas, 1993).

Squad value

At Euro 2020, there were national teams with many well-known players, as well as teams whose players mostly play in weaker leagues. Table 2 presents the values of the squads of all national teams that played at Euro 2020. It is worth noting that the value of England, the most valuable national team, was 28.5 times greater than the value of the least valuable national team – Finland.

Table 2. Value of national teams at Euro 2020

No.	Team	Squad value (mln EUR)
1	England	1,270.20
2	France	1,028.00
3	Germany	936.50
4	Spain	915.00
5	Portugal	872.50
6	Italy	764.00
7	Belgium	669.40
8	Netherlands	607.05
9	Croatia	375.80
10	Turkey	321.50
11	Austria	320.60
12	Denmark	310.70
13	Switzerland	283.50
14	Scotland	269.85
15	Poland	254.80
16	Sweden	215.05
17	Ukraine	197.20
18	Russia	190.30
19	Czech Republic	190.00
20	Wales	176.75
21	Slovakia	131.10
22	Hungary	74.73
23	North Macedonia	61.80
24	Finland	44.50

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Looking at the table above and the value of the England national team, it is logical to assume that they should be the main favourites for the championship. Actually they made it to the final, but Italy beat England in that game, winning 3-2 on penalties after a 1-1 draw at Wembley. As already mentioned, this study aims to discover any potential relationship between player values and a team's results. The r-Pearson correlation coefficient between the team's value and its final place in Euro 2020 was calculated: $r = -0.56$; $p < 0.004$. The correlation turned out to be statistically significant. There is a strong negative relationship between both variables. High values of one variable are accompanied by low values of the other: the greater the value of the team, the better (closer to the first) place at Euro 2020.

Since a team's value strongly correlates with its results, we may assume the hypothetical situation that every match at Euro 2020 was won by the team with the greater value. What would the final stages of the European Championship look like then? The diagram below presents such a hypothetical situation. Highlighted in gray are the teams that performed at a given stage of the tournament, and not highlighted are the teams that would have played if a more valuable team always won. Evidently, it is clear that the names of the teams quite often coincide.
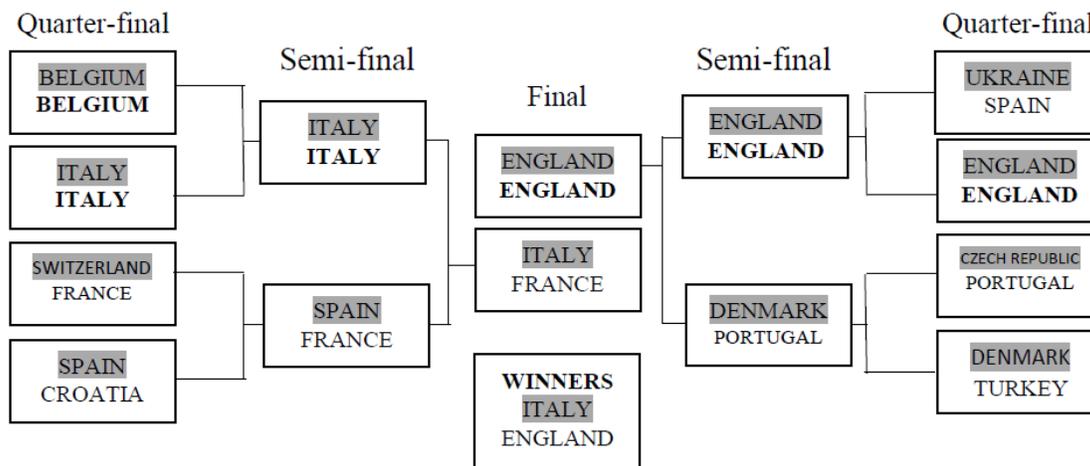

Diagram 1. Final stages of Euro 2020 in two versions: real (highlighted in gray) and hypothetical (if a more valuable team always won)

The r-Pearson correlation coefficients between the real and hypothetical classifications of Euro 2020 were calculated: $r = 0.63$; $p = 0.001$. The results show that in the case of Euro 2020, the high value of the team was a factor that was strongly associated with a good final result of this team. In order to study the data more thoroughly, it was considered essential to analyse the importance of other factors as well.

Population
The second analysed factor that may affect the position of a national team at Euro 2020 is the population size of a given country. A larger population usually means that more people play football in a given country and therefore there is a greater pool from which a national team can draw exceptional talents. At Euro 2020, the country with the largest population was Russia (144,400,000 citizens), followed by Germany (83,020,000), and Turkey (82,000,000). Looking at these three countries it has to be stated that Russia and Turkey finished last in their respective groups, and Germany lost to England in the round of 16.

As for the countries with the smallest populations, the following should be mentioned: North Macedonia (2,077,000), Wales (3,136,000), and Croatia (4,047,000). At Euro 2020, North Macedonia finished last in their group, Wales was knocked out in the round of 16 and so was Croatia. The r-Pearson correlation coefficient between a country's population and its final place in Euro 2020 was calculated: $r = -0.07$; $p = 0.738$. The correlation turned out to be not statistically significant.

Gross Domestic Product per capita
Another factor that may have had a potential impact on the results of a national team is Gross Domestic Product per capita. Per capita GDP is a global measure for calculating the prosperity of nations and is used by economists to analyse the prosperity of a country based on its economic growth (Investopedia, 2021). Typically, richer countries are able to invest more money in sport and some studies indicate that success is still dominated by a selective number of mainly wealthy nations (De Bosscher & Shibli, 2016).

Based on data from the World Bank, a ranking of countries participating in Euro 2020 was created in relation to the amount of GDP per capita (in USD) (The World Bank, 2021). The highest GDP per capita among the countries participating in Euro 2020 was in Switzerland – 86.602 USD, Denmark – 60.909 USD, and the Netherlands – 52.304 USD. In turn, the countries with the lowest GDP per capita were: Ukraine – 3,727 USD, North Macedonia – 5,888 USD and Turkey – 8,538 USD. Among the three richest countries, the Netherlands

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was eliminated the fastest in the round of 16, Switzerland in the quarter-final, and Denmark in the semi-final. In turn, looking at the three poorest countries, Ukraine advanced the furthest to the quarter-finals, and Turkey and North Macedonia finished Euro 2020 in the group stage. The r-Pearson correlation coefficient between a country's GDP per capita and its final place in Euro 2020 was calculated: r = -0.31; p =0.134. The correlation turned out to be not statistically significant.

UEFA and FIFA ranking

The UEFA Ranking is a numerical quantity used to rank and seed national teams in football competitions in Europe. This ranking is created and used by UEFA – an organization of European football associations (UEFA, 2021a). UEFA's top ten rankings are as follows: England, Spain, Italy, Germany, France, Portugal, Netherlands, Austria, Russia and Scotland. This ranking is specially created by UEFA to reflect the real actual strength of the national teams in Europe, so it was deemed valid to check if this ranking correlates with the final results of Euro 2020. The r-Pearson correlation coefficient between the team's position in the UEFA ranking and its final place in Euro 2020 was calculated: r = 0.48; p =0.017. The correlation turned out to be statistically significant. There is a moderate positive relationship between both variables.

The FIFA ranking is a list of national football teams associated with FIFA (International Football Federation). The aim of the ranking is to reflect the balance of power in world football as closely as possible. The top ten European teams in the FIFA ranking are: Belgium, England, France, Italy, Portugal, Spain, Denmark, Netherlands, Germany and Switzerland (FIFA, 2021). The r-Pearson correlation coefficient between the team's position in the FIFA ranking and its final place in Euro 2020 was calculated: r = 0.67; p <0.001. The correlation turned out to be statistically significant. There is a strong positive relationship between both variables.

Discussion

Football is the most popular sport in the world (Sourav, 2020). One of the things about football that ignites the interest of fans all over the world is the value of players. Obtaining an accurate economic value of football players throughout the year is highly valuable because it allows, to some extent, the valuation of the club, budget planning, and remuneration (He et al., 2015). Contrary to what some people outside the world of football often say, the values of players are not irrational. It is believed that a player's value should be related to his productivity (Majewski, 2016; Ruijg & van Ophem, 2015). In other words, the better the player, the greater his value should be. Based on the literature on the subject, the value of a player is determined, among other things, by his position on the pitch, age, and achievements (Carmichael & Thomas, 1993). The main goal of this article was to analyse whether the total value of players of a given national team affected this team's result at Euro 2020.

In the beginning, data on the value of all 620 players who took part in Euro 2020 were collected. Special attention was paid to players whose value was at least 75 million EUR. There were 16 such players at Euro 2020, which is as many as can appear in one team during the game (11 in the first team and 5 substitutions). The results show that the most valuable players most often play in English Premier League, are midfielders, and their average age is just over 24 years. The main goal of the study, however, was not to analyse the individual values of players but to check how the total value of a national team influences its results.

The results of the study indicate that the values of the national teams at Euro 2020 were very different. As an example, the value of England (the top team in this regard) was 28.5 times greater than the value of Finland (the last team in this regard). On the way to the final, England won 5 games and drew one. In the final, however, the Italians turned out to be superior. The r-Pearson correlation coefficient between a team's value and its final place in Euro 2020 was calculated: r = -0.56; p <0.004. The study also attempted to check what the final Euro 2020 classification would look like if the team with a greater value always won. It turns out that the actual final classification and the hypothetical one (the higher value wins) are strongly correlated with each other, r = 0.63; p = 0.001.

The study additionally checked whether other factors are also related to sports performance. It was assumed this would include a country's population and GDP per capita. It seemed that the more citizens live in a given country, the better the chance of it having a good national team. However, in the case of Euro 2020, the country's population did not significantly correlate with the results of its national team. In turn, GDP per capita was indicated because rich countries have greater opportunities to invest in sport, but also it was not a factor that significantly correlated with the final result of the national team at Euro 2020. In the world of football, there are also rankings that aim to determine the strength of national teams in Europe and in the world. It turned out that both the UEFA and FIFA rankings significantly positively correlated with the final results for Euro 2020, but the value of the latter was higher (0.48 and 0.67, respectively).

In the case of Euro 2020, a team's value turned out to be a better indicator of the team's victory than the professional ranking of national teams created by UEFA. In summary, however, it should be repeated that perhaps, the most fundamental aspect of professional football – an aspect that makes it so attractive is the level of competition (Pawlowski et al., 2010). This can also be understood as uncertainty of outcome – a term used in economics but which also has implications for both financial and sporting performance in professional team sports (Plumley et al., 2017).

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Conclusions

Football experts with the support of scientists do their best to determine the appropriate value of players. It is believed that a player's value should be related to his productivity. So basically the better the player, the higher his value. Consequently, it seems that a team with more overall value should usually beat a less valuable one. In this study, it was shown that a team's value significantly negatively correlated with its final place in Euro 2020 (r = -0.56). The value of this correlation is higher than the correlation of the ranking of national teams created by UEFA (r = 0.48). Interestingly, factors such as the population of a country and GDP per capita turned out to be irrelevant. Despite taking into account several factors, it cannot be said that all factors determining the victory or defeat of a given team have been established. In conclusion, however, it should be said that the most fundamental aspect of professional football – an aspect that makes it so attractive is uncertainty of outcome.

The presented results are also characterized by some limitations. First of all, it is not known if the same trends also occur in other forms of football competitions like league matches. The analysis also focused only on the European Championship and did not consider other large tournaments (like Copa America or the Africa Cup of Nations). It should be remembered that each big tournament may have its own characteristics. Therefore, subsequent research in this area should be carried out in the above-mentioned competitions to verify whether such trends also occur in other forms of competition.

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