

# ***European Soccer Transfer Market Analysis: The Determinant Factors in Transfer Fee***

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**Abstract:** This paper examines the European soccer transfer market, which, as the world's most popular sport, has its unique rules for player trading. The transfers are the most exciting events in the soccer world each year. While most studies focus on a player's market value, this paper intends to study the actual transfer amount, which represents the transaction that occurred, rather than an estimated result. In the preparation phase, this study gathered data on the top 25 transfers over the past 14 years (350 transactions in total) in an Excel spreadsheet. The study aims to determine the important substances that contribute to a player's transfer fee by constructing several linear multiple regression models using statistical software R Studio. It is concluded that age and in-field performance (goal and assist) are the most related factors for the whole dataset. However, the determining factors will vary depending on a player's position. Many of the factors are somewhat counterintuitive and further investigation is required.

**Keywords:** soccer statistics, transfer fee, linear regression

## **1. Introduction**

Soccer is the world's most popular sport, played by 250 million players in over 200 countries and with the largest global audience [1]. Nowadays, a successful soccer team is determined not only by the 11 players and the coach on the field, but also by various practitioners such as financial operators, medical teams, dieticians, rehabilitation therapists, and data analysts. Soccer is more than just a sport, the revenue it generates shall never be underestimated. In 2017, the revenue for European football clubs was rated at 27 billion US dollars, contributing a substantial amount to the global economy [2, 3]. According to the 25th year of the Deloitte Football Money League, the top 20 clubs in the Money League generated 111 million euro in matchday revenue, 4.5 billion euro in broadcast revenue, 3.5 billion euro in commercial revenue, and 8.2 billion euro in total revenue. Among these revenues, most of the shares have been spent for players.

The demand for excellent soccer players has been increasing dramatically over the past decades, and the transfer market is what makes these transactions possible. There are two trading periods: a 2-month period in July and August, and a 1-month period in January. During this time, clubs can trade their players. From most people's perspective, including enthusiasts, reporters, and players, they are willing to see talented player transferring to the club of their support. It is indeed excited, as the value of soccer players has exceeded 100 million euro: these numbers are much higher than historical figures, after adjusted for inflation [4]. From a managerial perspective, this is an opportunity to

introduce new players, sell existing players to adjust the team's tactics, sell redundant players that might affect the salary structure, or increase the club's popularity [5]. The performance in the transfer market is one of the most important factors in determining the team's success in the season, making it worth studying [6]. Therefore, researchers from different subjects are investigating the factors affect a player's transfer fee [4].

The factors related to a player's transfer fee are complex as they are a combination of on-field performances and off-field facts. Franceschi et al. conducted a systematic review over a 30-year span population and identified six main determinants for soccer players' value drivers, including time, labor, performance, club characteristics, player characteristics, and popularity [7]. More specifically, when setting the transfer fee as the response variable, the major set of explanatory variables are age, minutes played, goals, assists, yellow and red cards, appearances, national team status, and preferred foot [7]. It is worth mentioning that preferred foot is an important factor from another aspect, as it is congenital. Konefał et al. conducted a statistical analysis and concluded the both-footed players are more likely to succeed, because the non-dominant foot is usually used only under high pressure from the opponent, thus both-footed players might have higher transfer fees, as they are able to deal with more complicated situations in the field [8]. In a similar vein, Ante runs several multiple regression models to offer descriptive and empirical analysis of 389 individual transfers from the summer transfer window of the 2018/19 season into the five major European Leagues (British, Spanish, German, Italian, French). He hypothesized that a player's transfer fee is determined by player characteristics (age, height, weight, preferred foot, and region of birth), performance characteristics (goals, assists, shots, passing percentage, red cards, yellow cards, fouls committed, fouls received, etc.), popularity (followers on social media), the league he transferred to, and the player's position (forward, midfielder, defender, goalkeeper) [9]. Based on the literature, a player's transfer fee is not fully determined by supply and demand. Although team managers or soccer journalists have studied several transfer market indicators, some data-based methods are not widely applied [10]. For some players, simply looking at their goals or assists is unfair due to the position or other responsibilities they might take on the field.

Consequently, this paper aims to consider as many explanatory variables as possible to avoid undervaluing some players and to study potential factors that influence a player's transfer fee. In a macro perspective, a general review will be given, followed by an in-depth analysis based on the player's position. Finally, the player's performance during special events (World Cup or Euro Cup) will be specifically assessed. In addition to the variables mentioned in the above literature, a player's age, position, nationality, goals, assists, number of games played, preferred foot, and popularity should be considered undoubtedly. However, the dataset applied in this paper covers a 14-year time span, rather than Ante's analysis is based on a single year [10]. Therefore, in the early years many players did not have social media, which might affect the overall significance of the analysis. Thus, popularity will not be included in this paper, but a binary variable will be added to examine whether the new club and the player are from the same country. In addition to the aforementioned explanatory variables, injury records, trade time, current market value, and major event performances will also be included in the analysis.

After deliberation and optimization, this paper will run several multiple linear regression models to examine the core elements that impact a player's transfer fee, based on 12 explanatory variables.

## 2. Method

### 2.1. Data Sources

The data for this literature is collected from the famous German-based website Transfer-market, which is owned by Axel Springer SE. The research gathers 25 transfers in the most recent 14 years (350 entries in total).

### 2.2. Variable Selection

The data used in this paper consists of 350 transactions, among which 167 of them are strikers, 114 of them are midfielders, 64 of them are defenders, and 5 of them are goalkeepers. In this paper, transfer fee is set as the response variable, and the rest 12 are explanatory variables. These explanatory variables assess different aspects of a player. The specific elements and Logograms are shown below, in Table 1:

Table 1: Logogram and numbers of the 12 explanatory variables.

Elements	Logogram
Age	$x_1$
Position	$x_2$
Nationality	$x_3$
Club match played in the last five years	$x_4$
Goal	$x_5$
Assist	$x_6$
National player from its own country?	$x_7$
Preferred foot	$x_8$
Injury record	$x_9$
Current market value	$x_{10}$
Latest World Cup or continental level cup performance	$x_{11}$
Trade time	$x_{12}$

This study examines 12 explanatory variables related to soccer player's transactions. The first variable,  $x_1$ , records the player's age at the time of transfer. For  $x_2$ , it records the position of a player. This is a categorical variable, where 1 represents strikers, 2 represents midfielders, 3 represents wing defenders, 4 represents central defenders, and 5 represents goalkeepers. For  $x_3$ , it records the nationality of a player. This is a categorical variable, where 1 represents the country ranked 1-8, 2 represents the country ranked 9-16, 3 represents the country ranked 17-24, 4 represents the country ranked 25-32, 5 represents the country ranked 33-40, and 6 represents the country ranked over 40. The rank is retrieved from the FIFA National Men's Football Rank when the player's transaction is determined. For  $x_4$ , it records the number of games a player has played for his club over the past 5 years.

Variables  $x_5$  and  $x_6$  record the goals and assists contributed by the player to their previous club over the past 5 years respectively. For  $x_7$ , it records whether the player and their new club are from the same country. It is a binary variable where 0 represents NO and 1 represents YES. For  $x_8$ , it records a player's preferred foot. This is a categorical variable, where 1 represents right foot and 2 represents left foot. For  $x_9$ , it records the number of days the player has been injured in their career. Since injury is common throughout a season, this paper only includes absence over 60 days. For  $x_{10}$ , it records the current market value at the time of transfer. For  $x_{11}$ , it records a player's latest World

Cup or continental level match performance (Euro Cup specifically). This paper assigns a point system for a player based on their team's final ranking and individual honors.

For  $x_{12}$ , it records the time of the transaction. This is a categorical variable that splits the transfer window. 1 represents the transaction completed in July or first half of January, 2 represents the first half of August, 3 represents the second half of January, 4 represents the second half of August. In year 2020, due to the pandemic, the summer transfer market is different, so 1 represents the transaction completed in August, 2 represents the transaction completed in the first half of August, 3 represents the second half of September.

### 2.3. Research Protocol

This paper will utilize multiple linear regression techniques, with the transfer fee in million euros sets as the response variable, and the 12 factors set as explanatory variables. Firstly, this paper will analyze of the overall significance, and the database will then be divided into several sub-databases according to the variable 'position'. Finally, an analysis will be conducted to examine whether World Cup or continental level matches have an impact on the transfer fee, where some specific years will be chosen. Hypothesis tests and p-values associated with each explanatory variable will be applied to analyze the datasets. One of the advantages of this study is that it considers off-field factors, such as economic value a player can bring to a club. Finally, the significant explanatory variables identified in this study can help team managers make informed decisions, and the database created can contribute to future use in the development of soccer industry, addressing the gap in this sport.

## 3. Results and Discussion

The dataset records the top 25 transfers from 2009 to 2022, among which 167 of them are strikers, 114 of them are midfielders, 64 of them are defenders, 5 of them are goalkeepers.

### 3.1. General Analysis

This paper constructs a model based on 12 explanatory variables. A summary of the first model is presented in Table 2:

Table 2: Result for the overall model.

Elements	Estimate	p-value
$x_1$	-0.395	0.412
$x_{2\_2}$	-3.101	0.237
$x_{2\_3}$	0.313	0.941
$x_{2\_4}$	2.949	0.442
$x_{2\_5}$	3.533	0.673
$x_{3\_2}$	1.162	0.635
$x_{3\_3}$	-0.546	0.881
$x_{3\_4}$	-3.434	0.479
$x_{3\_5}$	-15.077	0.017*
$x_{3\_6}$	-1.358	0.678
$x_4$	-0.08	0.010*
$x_5$	0.012	0.762
$x_6$	0.076	0.231

Table 2: (continued).

x <sub>7_1</sub>	-2.934	0.249
x <sub>8_2</sub>	-0.349	0.875
x <sub>9</sub>	0.004	0.749
x <sub>10</sub>	0.872	<0.001***
x <sub>11</sub>	0.47	0.319
x <sub>12_2</sub>	7.581	0.009**
x <sub>12_3</sub>	2.549	0.463
x <sub>12_4</sub>	1.131	0.655

Note: \*, \*\*, \*\*\*, represent 10%, 5%, 1% significance level.

Based on the results of the hypothesis test, it is difficult to draw any firm conclusions, but the explanatory variable that is most strongly associated with the transfer fee is the ‘current market value’, which has an extremely small p-value. This is not surprising, as the institution that evaluates a player’s market value may also consider factors such as goal, assist, and number of matches played, which are also included in the explanatory variables. Since the p-value for this variable is extremely small, it may have a significant impact on the overall significance of the model. Therefore, this paper will exclude the explanatory variable ‘current market value’ in the following analysis. The new model will be constructed using the remaining 11 explanatory variables, as shown in Table 3 below:

Table 3: Result for the adjusted overall model.

element	Estimate	p-value
x <sub>1</sub>	-1.371	0.045*
x <sub>2_2</sub>	-3.37	0.367
x <sub>2_3</sub>	3.758	0.533
x <sub>2_4</sub>	9.519	0.081
x <sub>2_5</sub>	-20.161	0.088
x <sub>3_2</sub>	-2.481	0.475
x <sub>3_3</sub>	-7.801	0.131
x <sub>3_4</sub>	-9.539	0.166
x <sub>3_5</sub>	-13.724	0.125
x <sub>3_6</sub>	-5.339	0.251
x <sub>4</sub>	-0.023	0.601
x <sub>5</sub>	0.137	0.017*
x <sub>6</sub>	0.251	0.005**
x <sub>7_1</sub>	-7.121	0.049*
x <sub>8_2</sub>	0.249	0.937
x <sub>9</sub>	0.021	0.235
x <sub>10</sub>	0.853	0.204
x <sub>12_2</sub>	10.061	0.015*
x <sub>12_3</sub>	-0.201	0.968
x <sub>12_4</sub>	-4.377	0.221

The conclusion drawn from the hypothesis test is that goals and assists are highly related to a player's overall transfer value, and that scoring ability is significantly related to a player's transfer fee. This is because goal is the most important factor in winning a game, and assist is part of scoring. The fact that assist has a smaller p-value than goal could be explained by some midfielders or defenders

contribute more to the last pass than the last shot. The general rule in soccer is that players with stronger scoring ability tend to have higher transfer fees.

Additionally, a player's age, whether they are considered as a domestic player, and the transaction time are also influential factors. Young players usually expose a high potential: they either have shown enough abilities, or the owner trusts the player's age advantage. In addition, if the player and the club he transfers to are from the same country, it will have some effects on the transfer fee. Take the Premier League (EPL) as an example, the number of players from England only occupies less than 40% in the league. As a matter of fact, domestic players can bring extra values to the club based on a variety of factors. If two players have similar on-field data but are different in nationality, the transfer fee might be different. For example, in the dataset from 2022, Raheem Sterling and Gabriel Jesus had very similar records in goals and assists, and they were both transferring from an EPL club to another EPL club. The only distinct difference between them is Sterling is from England and Jesus is from Brazil. As a result, Sterling's transfer premium is 13.8 million euro, while the transfer premium for Jesus is -2.2 million euro. Another example is from 2020, when Leroy Sané, a German player transferred from an EPL club to a Bundesliga club, and Kai Havertz, a German player, transferred from a Bundesliga club to an EPL club. Despite their similar statistics, Havertz's transfer premium is 1 million of euro, while Sané's transfer premium is 31 million euro. Similarly, in that year, Timo Werner's transfer premium is 11 million euro. However, the output does not agree with the intuition. For every 1 million euro increase in transfer fees, the average difference between domestic and foreign player purchases by domestic clubs falls by 7.120 million euro. Brooks et al. conducted a regression database covering all the European elite leagues and concluded that English player has a premium of 40% in value and 25% premium in wage [11]. This suggests that domestic players are more popular among supporters than foreign players with similar statistics, and they should, therefore, be more expensive. However, a possible deduction could be the dataset only considers top transfers, and nationality might not be a significant variable among world-class players. Further investigation is, therefore, required to find out the rationale behind this. Finally, the transaction time is related to the transfer fee. According to the output, for every 1 million euro increase in transfer fees, the mean difference between transactions completed in the first half of August and those completed in July increases by 10.061 million euro. With the transfer window closing soon in August, many selling clubs are likely to increase their bargaining power due to the inelasticity of demand for the buying clubs.

Based on the analysis conducted, it is found that there are five significant determinants that influence a player's transfer fee. However, this dataset includes players from all the positions, including midfielders and defenders, whose primary responsibilities may not be to score, but to control or protect the defense line. The intrinsic values of goals and assists might be underestimated for these positions. It is therefore unfair to gather all players in the same dataset and judge them based on a uniform standard. Hence, the following step is to divide the positions and to conduct further analysis. It is important to note that since the dataset only includes five goalkeepers, this paper will not discuss the transfer fees for goalkeepers.

### 3.2. Analysis on Strikers

This dataset has gathered 167 strikers. Since the variable 'position' is eliminated, the new model has 10 explanatory variables. And the result shows as below in Table 4:

Table 4: Output for strikers.

element	Estimate	p-value
x <sub>1</sub>	-3.675	0.004**
x <sub>3_2</sub>	-6.063	0.329
x <sub>3_3</sub>	-6.581	0.426
x <sub>3_4</sub>	-9.845	0.365
x <sub>3_5</sub>	-21.908	0.157
x <sub>3_6</sub>	-5.085	0.481
x <sub>4</sub>	-0.108	0.196
x <sub>5</sub>	0.329	0.0004***
x <sub>6</sub>	0.609	0.0001***
x <sub>7_1</sub>	-0.002	0.999
x <sub>8_2</sub>	2.088	0.698
x <sub>9</sub>	0.037	0.231
x <sub>10</sub>	1.313	0.533
x <sub>12_2</sub>	12.404	0.078
x <sub>12_3</sub>	-3.771	0.667
x <sub>12_4</sub>	-2.868	0.659

Without any doubt, goals and assists are the most significant variables when considering a striker's performance. However, it is noticeable that assists have a lower p-value than goals. Since the dataset filters the top 25 transfers, the strikers must have scored abundant goals in game, so that the willingness to pay for the buying club can increase significantly. As for assists, they are a way to assess the striker's ability to lead their teammates to score. It might be a trend that for an excellent striker, scoring ability is their responsibility, but leading the team and supporting other teammates are more significant if one wants to be the top striker. In addition, age is a significant factor. The same reasoning discussed above can be applied here. The analysis for striker also reveals that the soccer world is simple: if the player can lead their team to win and they are young, the transfer price will increase.

### 3.3. Analysis on Midfielders

The dataset for midfielders contains 114 players, with 10 explanatory variables. The result shows in Table 5 as below:

Table 5: Output for midfielders.

element	Estimate	p-value
x <sub>1</sub>	0.261	0.762
x <sub>3_2</sub>	-0.008	0.999
x <sub>3_3</sub>	-2.611	0.725
x <sub>3_4</sub>	-19.373	0.029*
x <sub>3_5</sub>	-23.844	0.069
x <sub>3_6</sub>	1.548	0.799
x <sub>4</sub>	-0.031	0.596
x <sub>5</sub>	-0.257	.052*
x <sub>6</sub>	0.276	0.042*

Table 5: (continued).

x <sub>7_1</sub>	-14.803	0.005**
x <sub>8_2</sub>	-5.359	0.223
x <sub>9</sub>	-0.034	0.201
x <sub>10</sub>	0.531	0.364
x <sub>12_2</sub>	-0.521	0.929
x <sub>12_3</sub>	9.333	0.178
x <sub>12_4</sub>	-8.816	0.037

Based on the result, age does not appear to be a significant factor when considering a midfielder. One possible explanation is that experienced players may be more valuable from a manager's perspective. Another noticeable fact is the negative relationship between goals and the transfer fees. Based on the output, an increase in 1 million euro in transfer fee is associated with a mean decrease of 0.257 goals scored by a midfielder. This is counterintuitive and requires further investigation. This paper assumes that when a midfielder is too focused on scoring, they might lose sight of their original responsibilities such as controlling the overall pace, which may not be desirable to the coach. In contrast, assists are highly correlated with the transfer fee, which is reasonable. In addition, whether the club a player transferred to and the player himself are from the same club matters. Similar to goals, it is a negative relationship. Furthermore, for every 1 million euro increase in transfer fees, the difference between the average of transactions done in the second half of August and those done in July was -8.816 million euro. This is somewhat counterintuitive, as buying clubs might have very small price elasticity of demand. Thus, further investigation might be conducted to study this trend. Finally, nationality takes into account. According to the output, the higher the FIFA ranking of the player's country, the higher the transfer fee, after accounting for other variables. To summarize, the analysis for midfielders have shown some counterintuitive results, especially goals scored and trade time in the second half of August are negatively related with the response variable. Therefore, a more in-depth study shall be considered.

### 3.4. Analysis on Defenders

The output for defenders is presented below in Table 6:

Table 6: Output for defenders.

element	Estimate	p-value
x <sub>1</sub>	-3.101	0.016*
x <sub>3_2</sub>	-3.629	0.493
x <sub>3_3</sub>	-7.675	0.423
x <sub>3_4</sub>	-27.679	0.138
x <sub>3_5</sub>	14.517	0.304
x <sub>3_6</sub>	-10.929	0.328
x <sub>4</sub>	0.208	0.009**
x <sub>5</sub>	-0.369	0.356
x <sub>6</sub>	-0.319	0.217
x <sub>7_1</sub>	-3.025	0.587
x <sub>8_2</sub>	3.231	0.589
x <sub>9</sub>	0.032	0.206
x <sub>10</sub>	0.622	0.699



Table 6: (continued).

x <sub>12_2</sub>	14.052	0.054
x <sub>12_3</sub>	-1.814	0.812
x <sub>12_4</sub>	-1.241	0.855

The top two explanatory variables are age and club matches played in the last five years. The reason for the variable ‘age’ is referred to previous analysis, and the focus is to notice that ‘club matches played in the last five years’ is significantly related to the response variable. This variate can be viewed as a proof of experiences. In soccer and many other sports, defenders need to be calm, experienced with 100% concentration because a small mistake can ruin the effort of the whole team. Therefore, manager will pay more if a player has enough experiences gathered during the last five years. Interestingly, lower age and more time played are somewhat negatively related. Consequently, from the transfer market’s perspective, it is necessary to be young and have played enough games for an excellent defender. This is because experience is essential for developing the tactical awareness, decision-making skills, and physical ability required to excel in this position. Additionally, young players have more time to refine their skills and adapt to different playing styles.

### 3.5. Analysis on Player’s Major Match Performance

So far, the analysis is based on different positions. Most of the explanatory variables have been proved to be related with the response variable. However, injury record and preferred foot have never been shown in any of the sub-dataset. Another explanatory variable is the latest world cup or continental level cup performance. There are many examples that a player performed well in such world-focused soccer feast, and are attracted by many soccer clubs, like Enzo Fernández’s transfer to Chelsea after the 2022 FIFA World Cup, James Rodríguez’s transfer to Real Madrid after the 2014 FIFA World Cup. Thus, the following analysis selected year 2010, 2012, 2014, 2016, 2018, 2021, Enzo Fernández’s transfer to Chelsea, and Mykhaylo Mudryk’s transfer to Chelsea in 2022 (2022 FIFA World Cup is held in winter, and this two are the only transactions after the World Cup in 2022) to investigate whether the performances in these games have some effect on the player’s transfer fee, and the result shows as below in Table 7:

Table 7: Output for selected year transfers.

element	Estimate	p-value
x <sub>1</sub>	-0.371	0.719
x <sub>3_2</sub>	-5.836	0.313
x <sub>3_3</sub>	-15.277	0.044*
x <sub>3_4</sub>	-2.905	0.839
x <sub>3_5</sub>	-2.429	0.887
x <sub>3_6</sub>	-3.296	0.633
x <sub>4</sub>	-0.111	0.101
x <sub>5</sub>	0.167	0.021*
x <sub>6</sub>	0.196	0.184
x <sub>7_1</sub>	7.117	0.247
x <sub>8_2</sub>	0.431	0.931
x <sub>9</sub>	0.004	0.882
x <sub>10</sub>	1.674	0.037*

Table 7: (continued).

x <sub>12_2</sub>	3.924	0.616
x <sub>12_3</sub>	0.232	0.973
x <sub>12_4</sub>	-11.752	0.026*

The summary output shows that the World Cup or Continental level match performance is significantly related to the response variable. A conclusion can be drawn that an excellent performance in world-renowned game can increase a player's transfer fee. This is because these events are highly visible and attract global attention, making standout players more attractive to potential buyers.

#### 4. Conclusion

The focus of this whole analysis is to determine the crucial factors contribute to a soccer player's transfer fee. The analysis is conducted from the whole dataset to five sub datasets, three of them are based on a player's position, and the final subset especially examines the relationship between a player's World Cup or other continental level cup's performance and the transfer fee, whether a better performance can increase the transfer amount. After a complete analysis, based on the hypothesis test, most of the conclusion are reasonable. When it comes to evaluating strikers, the simplest metric is the number of goals scored, but assists are more critical for reaching a world-class level, as this indicates their ability to set up scoring opportunities for their teammates and not just themselves. Age plays a significant role in assessing a player's transfer fee, after accounting for other variates except for midfielders, for whom it is not as crucial. This means other aspects of their performance, such as technical skills, strategic thinking, and physical fitness may carry more weight in determining their value to a team. To excel as a defender, a player needs to be young and have played many games. In addition, a strong performance in major competitions, like the World Cup or European Cup, can increase a player's transfer fee. Furthermore, the timing of a transfer impacts the player's transfer amount, with the average transfer fee in the first half of August higher than that in July. Finally, other factors, such as a player's preferred foot or injury history, do not affect their transfer fee.

However, there are several conclusions that seems counter-intuitive. When it comes to evaluating transfer fees, a player's country of origin does not have a significant impact on their cost, regardless of whether they join a club in their home country or abroad. In some cases, the transfer fee for domestic players is cheaper than foreign players with similar statistics. For midfielders, scoring more goals decreases their transfer fee, suggesting that their value may be judged more on their ability to set up scoring opportunities for others. Finally, the transfer fee for midfielders does not inflate in last time but deflate. Thus, further study or investigation are required.

#### References

- [1] Cotta L 2016 Using fifa soccer video game data for soccer analytics *Proc. Workshop Large Scale Sports Anal.* 1–4.
- [2] Vroonen R 2017 Predicting the potential of professional soccer players *Proc. Mach. Learn. Data Mining Sports Anal.* 1–10.
- [3] Asif R 2016 Football (soccer) analytics: A case study on the availability and limitations of data for football analytics research *Int. J. Comput. Sci. Inf. Secur.* 516.
- [4] Frick B 2007 The football players' labor market: Empirical evidence from the major European leagues *Scottish J. Political Economy* 422–446.

- [5] Amir E and Livne G 2005 *Accounting, valuation and duration of football player contracts* *J. Bus. Finance Accounting* 549–586.
- [6] Pawlowski T and Breuer Hovemann C A 2010 *Top clubs' performance and the competitive situation in European domestic football competitions* *J. Sports Econ.* 186–202.
- [7] Franceschi M, et al. 2023 *Determinants of football players' valuation: A systematic review*. *Journal of Economic Surveys*.
- [8] Konefal M, et al. 2021 *Physical Activity of the Right-and Left-Footed Professional Soccer Players from Symmetrical Defensive Positions*. *Symmetry* 1551.
- [9] Ante L 2019 *Determinants of transfers fees: Evidence from the five major European football leagues*. University of Hamburg: Hamburg, Germany.
- [10] Müller O, Simons A and Weinmann M 2017 *Beyond crowd judgments: Data-driven estimation of market value in association football* *Eur. J. Oper. Res.* 611–624.
- [11] Bell, A. R., Brooks, C., & Brooks, R. (2023). *Are English football players overvalued?*. *Applied Economics*, 1-17.