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Original Article

Football players' brand as a factor in performance rights valuation

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Abstract:
Brand building is one of the steps in a huge process called football globalization. This study aimed to identify football players who (owing to their popularity, salaries and market value) should be treated as brands. The hypothesis formulated in this study is that the brand of the football player appears when residuals in the econometric model are extremely large (for selected player). This means that his theoretical value is biased by an additional variable. This hypothesis should be confirmed by the relation of annual earnings of a player to his market value. The methodology of this study was based on the feasible generalized least square method (FGLS) with full statistical verification. The data obtained from www.transfermarkt.de for 150 most valuable football players were used in the analysis. The assumption of taking into account only attacking players was based on two basic reasons: 1) for this very homogeneous group, the same main factors influence the player's market value (i.e., there is one set of independent variables), 2) for attacking players, the most spectacular transfers and the highest market values of their performance rights are observed.
Key Words: performance rights, football, valuation, econometrics

Introduction

The overall size of the European football market has been steadily growing in revenue for many years, reaching €28.4 billion in the 2017/2018 season. A total of 55% of this revenue belongs to the "big five" European leagues, which include English Premier League, German Bundesliga, Spanish La Liga, Italian Serie A, and French Ligue 1 [1]. Financial analysis of the Deloitte Sports Business Group indicates the TOP20 best football clubs in the world with the revenues equal €8.3 billion. These clubs, unquestionably, have strong brands. To understand the strength of brands, it is enough only to look at the first five football clubs in Deloitte's ranking, i.e., Real Madrid, FC Barcelona, Manchester United, Bayern Munich, and Manchester City. Commercial revenues of these five clubs exceeded €3.3 billion in the 2017/18 season [2].
Brand building is one of the steps in a huge process called football globalization. Top clubs are well-prepared for building their brand, e.g., using fan loyalty to create sub-brand products such as foods, caps, shirts, and towels. The biggest clubs recruit best coaches and players (e.g., Mourinho, Ancelotti, Ronaldo and Messi) to increase club brand [3]. Such activity is typically a joint venture, i.e., a fusion of brands aimed to increase the importance of brands and to generate additional profits.

According to the text of Bodet and Chanavat [4], a brand is composed of four factors: perceived quality, brand loyalty, brand awareness and brand image. The first factor is very easy to identify because it is closely related to footballer's performance on the pitch (goals, assists, tackles and saves). It is not easy to measure loyalty; however, indirectly, the strength of loyalty is related to official fan-page followers on social media or sale of T-shirts in soccer clubs. Brand awareness and brand image pose the biggest problem. Theoretically, Keller [5] defines an image as associations held in customer memory; however, this evaluation requires a questionnaire research on a big sample of customers. Therefore, it is crucial to determine whether football players can be treated as brands and, if they are, what are the consequences for the value of their performance rights.

Literature review indicates several econometric approaches proposed, among others, by Carmichael, Forrest and Simmons [6], Dobson, Gerrard and Howe [7], Lucifora and Simmons [8] and Wicker et al. [9]. The need to use quantitative methods to valuate footballers' performance rights is the result of many analyses. A very interesting approach is presented by Lozano and Gallego [10]. They tried to indicate deficits of accounting in the valuation process. They determined that the value of acquired players' transfer rights represents the most important asset on the balance sheet of the football club product life cycle (PLC); there was a significant and relevant accounting undervaluation in relation to market price, and the total calculations of squads are far higher than their accounting values. Other studies, which take into account the problem of performance rights' valuation, are still searching for the factors and methods of estimation [10, 11, 12].
This study aimed to identify football players who (owing to their popularity, salaries and market value) should be treated as brands. The starting point of this research was the estimation of econometric models of market values of the most valuable football players according to www.transfermarkt.de. The residuals of models

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indicate players (objects) for whom theoretical values deviate from empirical the most. For such objects, it was necessary to determine the reason for the existing high values of residuals. In this step, the analysis of salaries and market values of players was very helpful. In the next step, the estimation of econometric models was replicated; however, an additional variable was added to the set of independent variables, i.e., a dummy variable representing a "brand" or "goodwill" of players [14].

The hypothesis formulated in this study was that the brand of a football player can be identified by econometric model as extremely large residuals. Thus, we compared a list of selected players by econometric model with the list obtain using the brand importance ratio (BIR); BIR, de facto, is a proportion of annual earnings of a player to his market value. It is important that the BIR ratio is not used to estimate the theoretical market value of a football player; instead, it is used only as a confirmation that the player has his own "brand". Theoretically, this ratio can be used as an independent variable in econometric model; unfortunately, its values are not available for all players. It is possible to collect the data only for some, mainly the most popular players; in addition, low BIR value does not mean the existence of a player's brand but only its possibility. In fact, these data are subjective and used only to confirm that chosen player can be classified as football brand. It was assumed that extremely large residuals in classic econometric model (OLS) are caused by a dummy variable, which could be referred to as football brand. Thus, if the use of such variable for chosen players in the econometric model works, it means that the brand affects the valuation. Examples of BIR ratios for the most valuable football players are shown in Table 1.

Table 1. 15 most valuable football players with BIR values for February 2017

No.	Player	Market value (mil EUR)*	Annual Salary (mil EUR)**	BIR
1	Lionel Messi	120	75	0.63
2	Christiano Ronaldo	100	88	0.88
3	Neymar Jr.	100	35	0.35
4	Gareth Bale	90	32	0.36
5	Luis Suarez	90	22	0.24
6	Antoine Griezmann	80	9	0.11
7	Robert Lewandowski	80	15	0.19
8	Paul Pogba	80	20	0.25
9	Gonzalo Higuaín	75	14	0.19
10	Eden Hazard	70	18	0.25
11	Pierre-Emerick Aubameyang	65	5	0.08
12	Sergio Aguero	65	21	0.33
13	James Rodriguez	50	21	0.41
14	Agnel di Maria	50	19	0.39
15	Mesut Ozil	50	17	0.33

Note: * - www.transfermarkt.de; ** - https://salarysport.com/football/player

Table 1 contains information about values and salaries of the most valuable football players in February 2017. Usually, the BIR values of the most valuable players are below 1; this means that clubs that have rights to the players could, potentially, have additional profits. Such players may have a brand, which benefits both them and their employer. For the players with the BIR value over 1, their brand brings higher profits for the player than for the club. Therefore, econometric model can indicate which player brands may significantly affect the market value of the player; thus, extremely large residuals in the econometric model indicate significant brands.

Materials and methods

The methodology of this research was based on the previously proposed econometric models that used ordinary least square (OLS) and feasible generalized least square (FGLS) methods with full statistical verification (e.g., normality of rests, linearity Lagrange Multiplier and heteroscedasticity tests). In addition, the analysis of footballer's BIR ratio was used as the supporting method to confirm assumptions.

The data obtained from www.transfermarkt.de for 150 most valuable football players (playing as forwards) were used in this research. The assumption of taking into account only the forward players was based on two basic reasons. The first reason was that for this very homogeneous group, the same main factors affect the player's market value, i.e., there is one set of independent variables. The second reason was that for the forward players, we can observe the most spectacular transfers and the highest market values of their performance rights.

Transfermarkt is a leading website of transfers and market value of football players in almost all leagues in the world. This website is published in thirteen languages. The site offers football-related data such as:

- scores and results,
- football player performance data (e.g., goals, assists, cards, entrances on the pitch and substitutions),
- football news,
- transfer rumours,
- estimation of market value at different levels for most professional football leagues.

This website was launched in 2001; currently, it is one of the most visited websites in Germany. The site uses the idea of Surowiecki [15] (called the wisdom of crowds) and allows many individual users to participate in building the football players' market value together with professional sport experts. Many professional sport magazines and newspapers in Europe use data published by Transfermarkt. Many studies confirmed the estimations of market value published on Transfermarkt because the methodology used by the website is closely correlated with calculations of professional analytics and real salaries of football players [16]. The market value calculated and published by Transfermarkt became the foundation for several studies of the football transfer market in Europe [17, 18, 19, 20, 21]. The hypothetical concept of market valuation by the Transfermarkt service was presented in the work of Muller et al. [17]. Figure 1 shows the conceptualization of market value estimation at Transfermarkt.

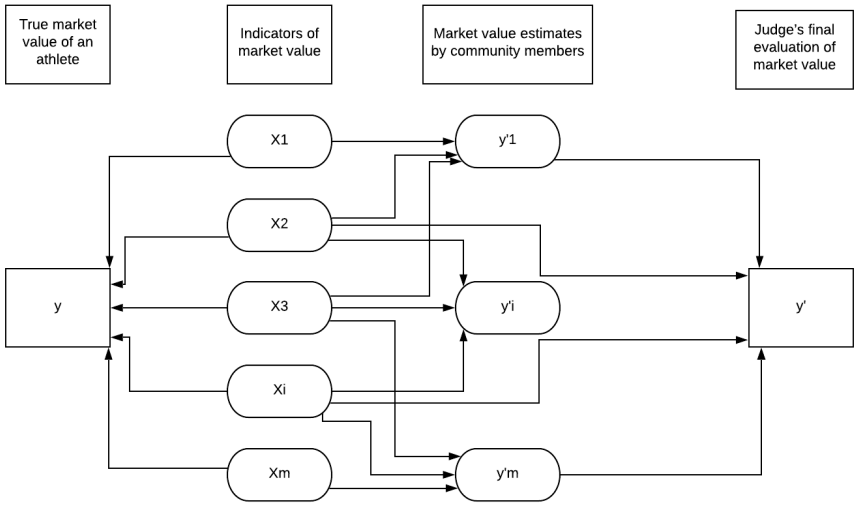


Figure 1. Concept of the market pricing process of the Transfermarkt web service

Note: [17]

The starting point for verification of the main hypothesis formulated in this study was based on models of valuation of footballers' performance rights. Previous studies have shown that the general typology of valuation methods can be presented as that shown in Table 2.

Table 2. Typology of methods of footballers' performance rights valuation

Type of methods	Experts method	Econometric models	Numeric methods	Methods using option models	Mixed approach
Data	Unknown, based on empirical experiences of the expert	Sport data, economic data, biological data, psychophysical data, hypothetical market values	Hypothetical market values (i.e., transfermakt.de)	Hypothetical market values (i.e., transfermakt.de), OPTA index values	Every available data
Costs	Unknown (hypothetically high)	Main sources of data are free of charge	Free of charge	Data from the OPTA index are not free	Main sources of data are free of charge
Verification	Difficult to verify	Comparison with the market value			
Complexity	Unknown	Easy to use	Low level of difficulty		Easy to use

Previous studies present many models that are mainly based on the commonly available data from numerous internet portals specialising on football games and players that publish characteristics of players and games (e.g., market values, number of goals, assists, yellow cards, double yellow cards, red cards and substitutes on/off). Some models use more sensitive data that can be obtained in two possible ways: original – as a result of

dedicated research (i.e., anthropometric and physical fitness characteristics), secondary – as an exclusive product for sale (i.e., values of the OPTA index).

The Bulletin of Economic Research used the work of Carmichael, Forrest and Simmons [6]. This study, which was published in 1999, was the first to use econometric models for the valuation of football players' performance rights. The approach used in the abovementioned study identifies the value of player transfer as a function of measurable and non-measurable characteristics of the player and his productivity. The analytical form of the model is as follows:

$$F_i = X_i\beta_i + Y_iV_i + Z_i\delta_i + e_i, \quad (1)$$

where:

F_i – value of the transfer;

X_i – vector of measurable characteristics and player's productivity indicator;

Y_i – vector of non-measurable characteristics of a player;

Z_i – vector of characteristics describing quality of the club selling the player.

Other studies developed several general approaches for estimating this intangible asset, as shown below.

Model of Dobson, Gerrard and Howe [7]:

$$F_i = \alpha_0 + \alpha_1X_i + \alpha_2V_i + \alpha_3B_i + u_i, \quad (2)$$

where B_i is the vector of characteristics of the club that is selling the player.

Model of Lucifora and Simmons [8]:

$$ln(F_i) = \alpha_0 + \alpha_1X_{1i} + \alpha_2X_{2i} + \alpha_3X_{3i} + \alpha_4Z_i + e_i, \quad (3)$$

with the following set of variables:

$ln(F_i)$ – natural logarithm of revenues related to the player's football performance;

X_{1i} – vector of characteristics describing game experience of the player;

X_{2i} – vector of characteristics describing game performance of the player;

X_{3i} – vector of characteristics describing game reputation of the player;

Z_i – vector of characteristics describing quality of the club selling the player.

Option pricing models – trinomial tree and option pricing models [22]

Discounted cash flow model, where the value of the player is a function of the team [23].

In the last 10 years, many models have been developed for characterizing footballers' performance rights or other characteristics that affect the market value of the player. Some interesting approaches, from the point of view of this research, are as follows: Wicker et al. [9], Buriamo et al. [24], Kesene [25] or Majewski [26].

More recent models are mostly focused on the analytical form of the model. The last propositions can be divided into two independent groups that are focused on the analytical form of the equation and the evaluation of performance instead of the valuation of performance rights.

The problem of adequateness of the market value and quality of benefits resulting from the possession of intangible assets can be observed in footballer's labour market. That is why the search for methods to improve the competitiveness of football clubs and players is still a current problem that is studied by scientists from the point of view of sport economics [27; 28; 29]. Two types of problems are extensively investigated in the literature, i.e., talent distribution and effective management of sport contracts.

The first problem (i.e., talent distribution) is widely described in the work of Kesene [25]. This work was focused on the league quality depending on talent investment and its allocation. It suggested that there was a divergence between talent investment and talent allocation in the case of profit-maximization goals of the league. Another group of researchers (e.g., Buriamo et al. [24]) considered the problem of effective management of sport contracts. They determined that a long-term contract is better both for the club and the player because it increases the effectiveness of the player, allows to use a player in a team to increase revenue and reduces the likelihood of misplaced investment. In contrast to other papers, the econometric model used in this study describes football player performance presented by Kicker's points. After the match, each player is evaluated by the experts for the Kicker sport magazine (a popular German sport magazine that is also available on the website – www.Kickier.de). Such system of grades is a type of valuation of a player's job that can be easily transferred into money or can be verified by the market value of the player during the season. The model proposed by the authors can be expressed by the equation:

$$Log\ GR_{it} = \beta_0 + \beta_1YR_{it} + \beta_2YE_{it} + \beta_3A_{it} + \beta_4A_{it}^2 + \beta_5G_{it} + \beta_6EXP_{it} + \beta_7PC_{it} + pe + ne + se + \epsilon \quad (4)$$

where:

$Log\ GR_{it}$ – quality of performance of the player measured by Kicker grades, which (based on salary indicators) are determined as the player's market valuation available in the Kicker magazine [30];

YR_{it} – player's contract length remaining;

YE_{it} – number of years into the current contract of the player;

A_{it} – age of the player;

G_{it} – number of games started in the current season;

EXP_{it} – number of years of the contract in the first Bundesliga;

PC_{it} – number of years in previous Bundesliga clubs;

pe – position effects;

ne – nationality effects;
se – season effects;
e – error.

Variables (position effects, nationality effects and season effects) are represented by dummy variables. The first variable is position effects; it assumes that the position on football pitch (forward, midfielder, defender and goalkeeper) is essential for the system of grades. The third variable (nationality) is of utmost importance in the abovementioned study. The authors divided players into groups of countries, i.e., South America, North America, Asia, Africa, Western and Eastern Europe, with Germany as the base category. Based on this division, the abovementioned study obtained interesting results. Specifically,

- compared to equivalent German nationals, Eastern Europeans and South Americans have greater number of years of contract remaining and, hence, higher performance grades.
- Asian players have shorter contract durations remaining and, hence, lower performance grades; they also have lower performance owing to contract years remaining.

The second model type was presented by Wicker et al. [9]. The approach proposed by the abovementioned authors solves the first problem of econometric modelling (i.e., adequateness of analytical form, normality of rests and homoscedasticity) and the second problem of econometric modelling (i.e., it elaborates the classical approach using new variables). The linearized version of the model is as follow:

$$Log\ (F) = \alpha_0 + \alpha_1 AGE + \alpha_2 AGE^2 + \alpha_3 GERMAN + \alpha_4 HIGH + \alpha_5 APPEAR + \alpha_6 TRANSFER + \alpha_7 TIME\ CLUB + \alpha_8 SP + \alpha_9 EFFIC + \alpha_{10} TACK + \alpha_{11} NAT + \alpha_{12} NAT\ TOP + \alpha_{13} RUN + \alpha_{14} RUN \cdot SP + \alpha_{15} RUN \cdot EFFIC + \alpha_{16} RUN \cdot TACK + \sum_{i=1}^{i} \alpha_i POSSITION + \sum_{i=1}^{21} \alpha_i TEAM + \varepsilon \quad (5)$$

where:
Log(F) – logarithm of the player's market value;
AGE – age of the player;
GERMAN – dummy variable representing the nationality effect (if GERMAN = 1, others = 0);
HIGH – height of the player (in cm);
APPEAR – number of appearances in half season;
TRANSFER – dummy variable (if transfer appears at the end of half season = 1);
TIME CLUB – time played by the player for the club (in years);
SP – scoring performance (goals + assists) per minute;
EFFIC – efficiency (rate) of ball contacts:

$$EFFIC = \frac{flanks + right\ passes + shots}{ball\ contacts} \quad (6)$$

TACK – tackling rate (tackles won/all tackles):

$$TACK = \frac{tackels\ won}{all\ tackles} \quad (7)$$

NAT – dummy variable (if the footballer plays for the national team of the home country = 1);
NAT TOP – dummy variable (if the footballer plays for the national team of the home country that is one of the top in FIFA = 1);
RUN – average number of intensive runs per game;
POSITION – dummy variable representing the position of the player in most games of one-half season (central defence, left wing defence, right wing defence, defence midfield, right wing midfield, left wing midfield, offense midfield and attack);
TEAM – dummy variable representing teams.

The authors discovered mainly insignificant and partially negative effects of the effort on logged market values based on the fixed effects in the models. Unfortunately, only one interaction (between intensive runs and tackling rate) had a significantly positive effect on the market value (logarithm). The results obtained by the authors are of interest for sport economics. The article aimed to examine the effect of effort on market values of footballers' performance rights, and the authors set some limitations such as drug cheating, player's level or a short period of time.

The latest approach for estimating the market value of football players was presented in the work of Majewski [14]. The author attempted to build an econometric model using available data by taking into account not only the significant relationship between variables but also goodness of estimation parameters, normality of rest distribution and homoscedasticity. The model was expressed by the following equation (own description based on Majewski [14]):

$$F_i = \beta_{1i} CAN_i + \beta_{2i} TCMV_i + \beta_3 D_i + u_i, \quad (8)$$

CAN_i – Canadian classification point of the player *i*;
$TCMV_i$ – total value of the club, where player *i* plays divided by the position of national team (country of origin) of player *i* in FIFA rating;
D_i – dummy variable representing "goodwill" or "brand" of player i (binary variable).
First, the author used the FGLS method to solve the problems with estimation. Second, the result was the identification of variables with significant impact on the market value of the player. The best approximation was obtained for the number of goals and assists as Canadian classification points, the value of the club and position

of the country of origin of the player in FIFA rating. The third conclusion of this article was that few players had their own brand, which strongly affected the valuation process. Another problem resulting from the market value of the player and whole team is the height of athlete salaries. There is a group of articles devoted to this part of financial management of the club [30; 31]. One of the largest studies was published in 2017 [17]. The authors of the abovementioned study presented a list of indicators that affect the market value of football players' performance rights. Variables were grouped into three categories: athlete characteristics (age, height, position, footedness and nationality), athlete performance (playing time, goals, assists, passing, dribbling, duelling, fouls and cards) and athlete popularity (news and internet links). Every factor was additionally described by taking into account previous studies (literature review). The abovementioned authors proposed the following model of market valuation:

$$MV_{i(t(l)\cdot p\cdot c)[s]} = \alpha_{i(t(l)\cdot p\cdot c)[s]} + \beta \cdot MV_{i(t(l)\cdot p\cdot c)[s-1]} + \chi^{'} \cdot Pch_{i(t(l)\cdot p\cdot c)[s]} + \delta^{'} \cdot Pperf_{i(t(l)\cdot p\cdot c)[s]} + \gamma^{'} \cdot Ppop_{i(t(l)\cdot p\cdot c)[s]} \mid u_{i(t(l)\cdot p\cdot c)[s]} \mid u_{t(l)} \mid u_{l} \mid u_{p} \mid u_{c} \mid u_{s} \mid \varepsilon_{i(t(l)\cdot p\cdot c)[s]} \quad (9)$$

where:

P_{ch} – player's characteristics;

P_{perf} – player's performance;

P_{pop} – player's popularity (Wikipedia page views, Google Trends search index, Reddit posts and YouTube videos);

$i(t(l) * p * c)[s]$ – indexes of player i of team t (in league l) on position p and continent of origin c corresponding to the season of observations s;

Random effects:

1) $u_{i(t(l)*p*c)[s]}$ – market values observed for player i over time s;

2) $u_{t(l)}$ – market values observed for players on the same team;

3) u_{l} – market values observed for teams in the same league;

4) u_{p} – market values observed for players who play the same position;

5) u_{c} – market values observed for players from the same continent of origin;

6) u_{s} – market values observed for players in the same season (us);

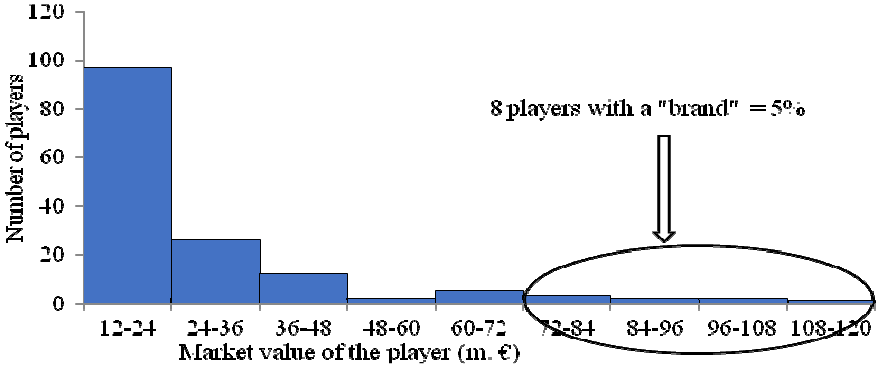
$\varepsilon_{i(t(l)*p*c)[s]}$ – captures the remaining error.

The abovementioned authors assumed that the random effects and the error term should be independent and normally distributed with mean zero and standard deviation σμ.

The base for consideration in this research is the econometric model estimated using the FGLS method [32]. In the first step, classic econometric model was estimated and verified. The decision to use another estimation method to improve results was undertaken after testing properties of estimated models. The second step was to identify outliers (objects) that had an abnormally large difference between empirical and theoretical values. For these objects, a dummy variable representing a brand has the value of 1; for the rest of the objects, the value is 0. Two types of model estimation procedures for equation 8 were analysed: OLS and FGLS. The results are presented only for the best approximation.

Results

Among the models estimated (with different diagnostic variables and methods of estimation) in this study, the authors of this study decided to focus on the model proposed by Majewski [14]. The dependent variable was the market value of the football player; independent variables were Canadian classification points (goals and assists), weighted market value of the club (calculated as the relation of the market value of the club divided by FIFA rating points for each player) and dummy variable for football brands (players). The models are estimated using FGLS. The econometric model estimated using OLS was verified.



Note: The work is based on the data retrieved from www.transfermarkt.de on February 10, 2017.

Figure 2. Distribution of market values of the most valuable attackers (offensive players)

Figure 2 shows the distribution of the dependent variable (market values of players' performance rights in February 2017). It is similar to Pareto distribution; of note, 5% of the most valuable footballers (8 players) are

worth €735 million (nearly 23% of the total value of all 150 players). Such concentration of value suggests that this group should be treated in a special way (should be excluded from the dataset owing to regression estimation problems or should be marked as special values). The linear econometric model (OLS) acquires the following parameters (Table 3).

Table 3. OLS model of top 150 forward players' market value (according to the data from February 10, 2017)

Variable	Coefficient	Standard error	t-Student	p-value	
const	4.94141	2.17630	2.271	0.0246	**
CAN_i	1.23051	0.137969	8.919	<0.0001	***
$TCMV_i$	0.0582079	0.00935479	6.222	<0.0001	***

Note: *** – significant at p < .001

Table 4 presents estimation parameters of the OLS model to demonstrate how well this model fits the real data. However, really important information is shown in Table 5; this information requires the correct application of the OLS model. Three tests were used here: non-linearity for squares [33], White test for heteroskedasticity [34] and normality of residuals [35].

Table 4. Estimation characteristics

Average value of the dependent variable	26.23667	Standard deviation of the dependent variable	19.75561
Residuals square	28478.10	Standard error of residuals	13.91864
R-square coefficient	0.510285	Adjusted R-square	0.503622
F(2, 147)	76.58719	p-value of the F test	$1.63e^{-23}$
Likelihood logarithm	−606.3099	Akaike's criterion	1218.620
Schwarz's criterion	1227.652	Hannan–Quinn's criterion	1222.289

Table 5. Testing of the OLS model

Test	Value of statistic	p-value
Non-linearity (squares)	LM = 20.7253	$3.15907e^{-05}$
White (heteroskedasticity)	LM = 38.1553	$3.51172e^{-07}$
Normality of residual	Chi-square(2) = 26.0443	$2.21086e^{-06}$

It was decided to confirm marking with dummy variables of each player from the indicated eight players using the rests of the multiple regression models (the best one estimated using OLS); the highest rests of the model were obtained for the most valuable footballers. The decision which player should be marked as "stand out" ("1" in dummy variable), was based on the R-square of FGLS models (the best approximation was for the "1" values for the eight most valuable players). The results for the best model are shown in Table 6.

Table 6. FGLS model of top 150 forward players' market value (according to the data from February 10, 2017)

Variable	***Coefficient***	***Standard Error***	***t-Student value***	***p-value***
Cons	13.6475	0.591531	23.0716	<.00001***
CAN_i	0.3838	0.074168	5.1751	<.00001***
$TCMV_i$	0.0396	0.004442	8.9053	<.00001***
D	59.8482	3.299390	18.1392	<.00001***

Note: *** – significant at p < .001

Table 7. Estimation characteristics

R-square coefficient	0.988773	Adjusted R-square	0.988542
F(5. 145)	4286.123	p-value of F test	$4.5e^{-142}$
Likelihood logarithm	−301.0837	Akaike's criterion	610.1673
Schwarz's criterion	622.2098	Hannan-Quinn's criterion	615.0598

Discussion

The obtained model shows that the dummy variable greatly affects the market value of football players. When using this variable in the model, the R-square coefficient went up from 0.63 to 0.988. The other variables positively affected the market value of football players; thus, the goals, assists, club value and FIFA rating are closely related to the valuation process of the footballer. All independent variables used in econometric modelling have statistically significant parameters.

Owing to the use of dummy variable representing "brand", the model increases the theoretical value of the branded player by approximately €59.85 million, assuming that other variables do not change. This variable has the strongest effect on the value of footballers' performance rights. Thus, it is possible to identify football brands using econometric tools, i.e., by analysing the distribution of players' market values, analysing rests of the OLS model, and using a dummy variable (representing brands) in the best model for the pricing process.

This study aims to show that econometric models can be used for the identification of the most recognized football brands. First, it is essential to identify the best model for the market value of players. Using the dummy variables and results of estimation, it is possible to identify the most important brands in European football. They are as follows: Lionel Messi, Neymar, Christiano Ronaldo, Luis Suarez, Gareth Bale, Antoine Griezmann, Robert Lewandowski and Gonzalo Higuaín (see Table 1 – all of these players are in the TOP15 most valuable players).

It can be argued whether the use of econometric modelling to valuate footballers' performance rights is justified. Taking into account literature review, such approach is proper but not as easy as it seems. The first problem is to have a big set of homoscedastic data at disposal to estimate econometric models. However, this is not possible owing to the "footballer's brand" effect for example. The second problem is time, which increasingly affects the market value of players. Here, two types of changes observed were – demographic (age of a player) and game performance (goals, assists and cards).

This study allows us to conclude that econometric modelling creates an opportunity to identify football players as a "brand". This significantly affects clubs and their budgets, which (using the proposed model) will allow to theoretically (based on dependent variables, independent variables and a fictitious variable) estimate whether a specific player acquired for the club is or will become a brand. This is directly related to club revenue. Through econometric modelling, it is possible to theoretically determine which players will create the most recognizable brands and thus generate profits.

This study identifies eight players who are brands in European football. They are associated and identified with specific clubs, sponsors and actions. This is important for club owners who earn extra income by hiring such players. This study used identified attackers (offensive players) who are usually the most recognizable to football fans and people not associated with football. It is important that the results obtained by econometric modelling (8 players) are not the same as eight highest value transfers in the period considered in this study. This creates theoretical possibilities to search for players who will be a brand in the future; thus, the value of their contracts is not the highest yet.

Future research will show whether there is a similar relationship and whether it is possible to use econometric modelling for players playing in other positions (mid-fielders, defenders and goalkeepers). For club owners, this is certainly an important signal to use theoretical modelling capabilities to change priorities when hiring players (by taking into account additional revenues that the club can obtain owing to brands).
It can be assumed that the use of econometric modelling will allow to better manage football clubs in the economic and personal sense in the future.

Conclusions

The aim of this article was to identify football players who (owing to their popularity, salaries and market value) should be treated as brands. Econometric model with dummy variables was used to achieve this goal. It was possible to indicate the most important player-brands in European football. They were as follows: Lionel Messi, Neymar, Christiano Ronaldo, Luis Suarez, Gareth Bale, Antoine Griezmann, Robert Lewandowski and Gonzalo Higuaín. Using "0-1 variables" (i.e., "brands") in the model, we determined that (for the group of eight players) the theoretical value increased by approximately €59.85 million, assuming that other variables did not change.

In addition, the obtained model showed that for offensive players, the country of origin affected their market value (this variable was included in the model as an element of the variable, i.e., the total value of club where the player plays divided by the position of national team of the player in FIFA rating). The research on offensive players will be followed by further research considering other positions on the football pitch.

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