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Original Article

Transfer spending and sports performance on the example of selected European football clubs. The Granger causality approach.

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Abstract:
The issue of causality in economics can be analyzed in different ways. There are many econometric methods that can be applied to study the causal relationships between the variables. A new and still not explored field is the sports economics, where the researchers consider the relationships between clubs' financial and organizational performance. To understand these phenomena, the authors use various statistical and econometrical methods. It is clearly visible in the growing number of publications in this area. In this paper, author attempts to investigate and describe the Granger-causality concept in finance-sports performance of selected football clubs. The following paper aims to identify causality and its direction between players' transfer values and clubs' sports performance in football. For the purpose of the thesis, the following hypotheses had been developed. H1: there exists a causal relationship between transfer spending and points of the selected football clubs; H2: there exists a causal relationship between transfer spending and standings of the selected football clubs. The research concerns the analysis of the causality relationship between financial and sports performance on the example of five best teams from five best European football leagues. All selected clubs characterize the best sports performance in their native leagues. In the study, three variables have been used. One of them has financial nature, while two relate to sports performance. Data reflect the two rounds that appear during every football season. The research includes data from the first round of season 2003/2004 to the first round of season 2020/2021. It contains information about transfer values, the standings and points gathered by the clubs in a semi-year frequency. The research tool used for the study is GRETL software. Thank to this solution it is possible to test stationarity and develop the VAR model. This relationship between pairs of selected variables occurs only in a small percentage of cases, or it cannot be identified at all. As a final concussion, the weak utility of the approach for the practical purpose is suggested. The last part of the paper is a conclusion where the author put the list of limitations and recommendations for further researches.
Key Words*:* **football club management, football finance, players' transfers, sports economics, VAR model**

Introduction

The causality is an interesting phenomenon from the perspective of sports. That is why there can be found the articles that describe this issue in a various context (Ramezanzade and Arabnarmi, 2017). The attractive area is the relationship between players' transfers values and results obtained by the football teams. The players' transfers can have a various influence on sports organizations. They can be the reasons for providing the coopetition activities between clubs (Szortyka, 2021). Moreover, the transfers mainly affect the organizational structures of the clubs by changing their cross-cultural abilities (Jagielski and Zhang, 2021). The financial characteristics of transfers is the issue of the growing number of scientific articles. The researchers analyze the amounts and numbers of transfers to find their economic explanation. Every time when new, big transfer is announced, the public opinion creates the statement that the values of players are unreasonably high. On the other hand, there are numerous of people who basing on primary economic laws explain that if there is anyone who wants to pay high amounts of money for a specific player, it means this player is worth such money. Players' transfers are the main sources of inter-organizational partnership relations. Transfers play the essential role in conducting business by football clubs. Metelski (2021) presents his findings about the factors that affect the value of football players in the transfer market. The author underlines the position on the pitch, player's age and destination country as a crucial in creating the transfer value (Metelski, 2021). Additionally, the impressive values of transfers and complex procedures make them a crucial element in creating networks of football clubs (Szortyka, 2020). The problem of financial aspect of players' transfers is often analyzed in scientific papers. It makes the discussion about the changes in financial structures of football clubs current in the discussions of players, managers, directors, owners, and fans of the football teams. This is mainly because, the evolution of organizational structures of clubs in top European Leagues is more and more intensive. This issue seems to be especially relevant from the perspective of the competitiveness in championships. Public opinion suggests that

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unlimited amounts of financial resources pumped into the big sports clubs make enormous disproportions between huge football brands and small, less popular football teams.

The financial perspective is important from the context of football club management. The transfers values can significantly influence the financial conditions of a football club (Pawłowski, 2020). The transfer of players is an interesting field for analysis from the perspective of sports performance in football. One of the most famous books about the financial aspect of football is book by Kuper and Szymanski (2018) where authors attempts to explain the role of spending on transfers and sports performance in football clubs. Tomkins et al. (2018) continue discussion about the connection between transfer spending and sports performance. Their analysis includes the values of transfers starting from season 1992/1993 in the English Premier League. They conclude that transfer spending and salaries are relevant in analyzing sports performance. Moreover, they assume the evidence of professionalism and efficiency in the transfer market depends on buying at low prices and selling at high. However, the efficiency of football clubs in this aspect is impressively low. In the literature, there are articles relating to this issue in a different way (Coates et al., 2017; Depken and Globan, 2021). The researchers present both positive (Tymińska, 2015; Dimitropoulos and Scafarto, 2021) and negative (Ferri et al., 2017) relationships between the selected variables.

In the study by Tymińska (2015) there is an analysis of Polish football clubs in seasons 2008/2009 – 2013/2014, the author confirms that revenues (also from players' transfers) correlate with sports performance. Also, Dimitropoulos and Scafarto (2021), in their study about the Italian football clubs in seasons 2007/2008 – 2016/2017 show a positive relationship on the relation between net transfer fees and sports results. On the other hand, Ferri et al. (2017) also focused on the Italian league, but in seasons 2007/2008 – 2013/2014, where they examined that there is no significant relationship between players transfers spending and sports performance. As it can be observed the results depend on the selected sample and time scope considered in a research. Thus, there is a need for expanding the knowledge in this area by conducting innovative studies. This paper is an attempt to examine whether the approach called "*pay as you play*" has an economic substantiation in football. By building the VAR model and testing the selected variables, the author verifies the causal relationships between financial and sports performance elements describing players' transfers. The unique and unconventional approach used in the research present the problem from the new, currently undescribed perspective.

Material & methods

The causality phenomenon has an intensely philosophical background (Syczewska, 2014; Maziarz, 2020). However, causality is willingly discussed in the economics papers. In such publications, the assumption that every phenomenon has a cause is a fundamental principle (Sroka, 2012). In the simplest words, a causal relationship describes the dependence between two different phenomena. One of them, called a cause, is able to affect the other one – defined as an effect. Further, the basic idea of causality can be defined as (Loredana, 2017):

phenomenon C is a cause of phenomenon E, so in case of no existence of C, E should not appear as well.

In economic sciences, causality is strongly linked to the issue of probability. Thanks to that, it is possible to not only verify the causal relationship between two phenomena but also to assess how high is a probability of existing an effect caused by a specific factor (van Rooij and Schulz, 2019). One of the methods for working with causality in economics is a Granger causality approach. Granger developed his concept in 1969 (Castle and Hendry, 2017; Kingston and Lilly-Tariah, 2018). In his paper, he assumes that the feedback mechanism in causality relationships is recognized as a sum of two separate factors. In the two-variable model, Granger defines the causality as Y_t causes X_t provided some b_j is not zero. The general model of such relationship looks as follows:

$$X_t + b_0 Y_t = \sum_{j=1}^{m} a_j X_{t-j} + \sum_{j=1}^{m} b_j Y_{t-j} + \varepsilon_t \quad (1)$$

$$Y_t + c_0 X_t = \sum_{j=1}^{m} c_j X_{t-j} + \sum_{j=1}^{m} d_j Y_{t-j} + \eta_t \quad (2)$$

Additionally, X_t is causing Y_t if some c_j is not zero. If both conditions are met, it is possible to notice a feedback relationship between X_t and Y_t. Economists use the Granger-causality test to predict whether time series are useful in forecasting future linked phenomena (Granger, 1969). The Granger-causality concept has its followers and opponents. The fact is, the approach has both advantages and disadvantages (Maziarz, 2015). However, and most critical is a fact that the concept is easily applicable in econometrics, by using the VAR model. Moreover, G-causality can be used to verify current theoretical relationships and study novel economic areas (Osińska, 2008). To identify the Granger-causality between two variables, it is necessary to go through the sequence of steps.

The first step is to verify the stationarity of the processes. The process is stationary when the mean and variance of the process do not change over time. Usually it is used in time series analysis. However, the non-stationary data can be transformed into stationary data (Lau et al., 2019). There is the Granger procedure for cointegrated procedures known as Toda and Yamamoto test. The approach developed by Toda and Yamamoto (1995) investigates the long-run causal relationship between two variables. Test bases on the estimation of vector autoregressive (VAR) model in levels. It helps to minimize the risk of bad identification of the order of integration and cointegration between variables decreases. Simply, Toda and Yamamoto found a method to

eliminate the problem linked to non-stationarity and co-integration between series (Czapla, 2009; Amiri and Ventelou, 2012). To examine the stationarity, there can be used the Dickey-Fuller test for a unit root and its developed form – the Augmented Dickey-Fuller test. The test examines the null-hypothesis that a unit root exists in an AR (autoregressive) model.

The alternative hypothesis stands for the stationarity or trend-stationarity of the analyzed processes. The Augmented Dickey-Fuller (ADF) test helps to delete all the structural issues related to autocorrelation in the time series. Cointegration of two stochastic processes can be defined as follows: two processes X_t and Y_t are cointegrated of order *(d, b)* (X_t, $Y_t \sim CI(d, b)$, $d \geq b > 0$), if:

a) the order of integration *d* of both processes is the same;
b) there exists the linear combination of these processes $u_t = \alpha_1 X_t + \alpha_2 Y_t$, which is integrated of order *d-b* (Wolski, 2020).

When $d = b = 1$ cointegration means, that both processes X_t and Y_t are integrated of order 1, and there are such α_1 and α_2 which linear combination $u_t = \alpha_1 X_t + \alpha_2 Y_t$ is integrated of order 0. In this case, the deviations of both processes in long-run equilibrium are stationary. In the case of X_t and Y_t processes, the possible situations in stationarity analysis are:

a) if $X_t \sim I(1)$ and $Y_t \sim I(0)$, then $u_t \sim I(1)$: the processes are not cointegrated;
b) if $X_t \sim I(0)$ and $Y_t \sim I(1)$, then $u_t \sim I(1)$: the processes are not cointegrated;
c) if $X_t \sim I(1)$ and $Y_t \sim I(1)$, then, when $u_t \sim I(1)$: the processes are not cointegrated, but when $u_t \sim I(0)$: the processes are cointegrated;
d) if $X_t \sim I(0)$ and $Y_t \sim I(0)$, then $u_t \sim I(0)$: the processes are not cointegrated (Batóg, 2016).

Cointegration presents when both time series X_t and Y_t are integrated of order 1 (I(1)). It means that the null-hypothesis is not rejected (Beag and Singla, 2014). In the DF test, the null-hypothesis assumes the existence of a unit root. Therefore, the null-hypothesis is rejected (the value of the t-statistic of the sample is smaller than the lower critical value). In this case, the series are integrated of order 0 (the series are stationary), and the unit root is not present. If there is no need for rejecting the null-hypothesis, it means that the process is I(1). Cointegration happens if each time series X_t and Y_t is integrated of order 1 (I(1)). In such a case, the null-hypothesis of the unit root is not rejected, and u_t from the cointegrating equation are not integrated I(1). It means that the null-hypothesis of the unit root is rejected (Batóg, 2016).

VAR models (Vector-Autoregression models) can be applied for stationary processes. In their nature VAR models include the variable's lagged (past) values, the lagged values of the other variables in the model, and an error term. VAR models help carry out a bivariate test of Granger-causality between two variables (Szaruga, 2016). The general form of the model can be presented as follows (Lütkepohl, 2005):

$$\begin{pmatrix} p_t \\ r_t \end{pmatrix} = \begin{pmatrix} c_1 \\ c_2 \end{pmatrix} + \begin{pmatrix} d_1 t \\ d_2 t \end{pmatrix} + \begin{pmatrix} \emptyset_{11}^{(1)} & \emptyset_{12}^{(1)} \\ \emptyset_{21}^{(1)} & \emptyset_{22}^{(1)} \end{pmatrix} \begin{pmatrix} p_{t-1} \\ r_{t-1} \end{pmatrix} + \cdots + \begin{pmatrix} \emptyset_{11}^{(m)} & \emptyset_{12}^{(m)} \\ \emptyset_{21}^{(m)} & \emptyset_{22}^{(m)} \end{pmatrix} \begin{pmatrix} p_{t-m} \\ r_{t-m} \end{pmatrix} + \begin{pmatrix} u_{1t} \\ u_{2t} \end{pmatrix} \quad (3)$$

where:

u_{it} (i = 1, 2) are random error terms, c_i, d_i and $\emptyset_{ij}^{(k)}$ (i, j = 1, 2; k = 1 … m) are *constants* and *t* represents a *deterministic time trend*. Testing relationship, in this case, depends on two issues. Number one is the choice of the lag of the variable. The second is the stationary analysis. If p_t and r_t are non-stationary, it is needed to work with a transformed equation, expressed in ether difference or error correction form.

Finding the causal relationship between transfers values and sports performance was the main motivation for writing the article. The study's goal is to indicate if paying high amounts for the players has an economic explanation from the perspective of Granger causality approach. The hypotheses made for the purpose of the study are as follows, H1: there exists a causal relationship between transfer spending and achieved number of points by selected football clubs; H2: there exists a causal relationship between transfer spending and standings in national championships of selected football clubs. At the beginning of the research, it was a strategic decision which football teams should be selected. The fundamental assumption was to focus on the five best European football leagues: English Premier League; German Bundesliga; French Ligue 1; Italian Serie A and Spanish La Liga. The next criterion was the availability of the data. There was demanded complete information about the transfer values, standings and points, at least, in the 21st century. The author's idea was to select the teams which had won the highest number of champion titles in their national championships between 2000 and 2018. In the case of the equal number of champion titles, the second criterion was the aggregated number of points during the seasons. The first step was to collect all the information about the clubs' standings from the selected football leagues starting from season 1999/2000 to 2017/2018.

In the case of the German Bundesliga, the choice was clear to make. Undoubtedly, the most titled German team in the selected period is Bayern Munich – 13 champion titles (1429 points during 19 seasons). The second place is for Borussia Dortmund – 3 titles (1114 points), and then SV Werder Bremen (992 points); VfL Wolfsburg (982 points) and VfB Stuttgart (785 points) – 1 title of each of those clubs.

The successive league was French Ligue 1. This case was slightly more complicated because the most titled French team is Olympique Lyon – 7 titles (1356 points in 19 seasons). However, there is a lack of information about the financial results of the team on the internet. That is why the author decided to choose the second-best team of the league that FC Paris Saint-Germain (PSG) is (6 titles; 1106 points). Additionally, PSG is the team

that made the most significant performance in the French league during the last decade. The team dominated the championships between the 2011/2012 and 2017/2018 seasons when PSG won 6 out of 7 titles. The following teams in the ranking are Olympic Marseille (1078 points); LOSC Lille (1010 points); FC Girondins Bordeaux (913 points), and AS Monaco (754 points). All of these teams achieved 1 French champion title. Spanish La Liga was the issue of the next selection procedure. This decision was also not easy to make. Because of the problems with the financial transparency, the decision about taking the most titled Spanish team – FC Barcelona (10 titles; 1579 points during 19 seasons) was rejected. Instead, the second most titled team – FC Real Madrid (6 titles; 1562 points) was taken. The third place in the ranking was taken by Valencia FC (2 titles; 1109 points). Moreover, Atlético Madrid (1 title; 1024 points) was placed behind them. The less complicated was Italian Serie A. This championship was won by Juventus FC 11 times. The club gathered 1357 points during 19 seasons. The second place took Inter Milan – 5 titles; 1313 points. Then, AC Milan – 2 titles; 1248 points, and AS Roma – 1 title; 1325 points. Finally, it is a place for making the decision for English Premier League. This league is recognized as the best, most even, and competitive league in the world. The evidence can be seen in the presented ranking. The most titled English club is Manchester United F.C. The club collected 1473 points in the analyzed period. This result gives them 7 champions titles. The second team was Chelsea F.C. with 5 titles and 1443 points. Next was Manchester City F.C., with 4 titles and 981 points. The last team in the ranking was Arsenal F.C. which won 3 champions titles and gathered 1384 points.

When the selection procedure had been finished, the next step was to collect the data for the analysis. The data had been gathered from the most popular football database – transfermarkt.com. The website includes various football statistics that can be used in econometric analyses. The author decided to use three variables, one of them has a financial characteristic and two have a sports performance nature. The selected variable of financial performance is transfers spending (named: _transfer_spending) characterized in millions of euros. On the other hand, the specified determinants of sports performance are final position in the national league (named: _standings) and the number of points collected during each round of a season (named: _points). The novelty of the research approach is focusing attention only on the top European clubs than taking one national league into consideration. The analysis includes the data in the form of time series in semi-year frequency. The choice of frequency was motivated by the characteristics of the football national championships played during the season. The season consists of two rounds: main (played in fall/winter) and rematch round (played in spring/summer). The data used in analysis contain information from the first round of season 2003/2004 until the first round of the season 2020/2021 in half-year range (which cover two rounds of a specific season). The choice about the period was excused by the limitations in the data obtaining. The football statistics are being collected from beginning of the 21st century. The spatial scope of the sample refers to the most awarded football clubs of five top European leagues (English, German, French, Italian and Spanish) in the period covered by the study. The decision based on the current UEFA ranking of the European football leagues (UEFA Ranking, 2021). As a result, the following organizations were selected: Manchester United; named: Man_Utd_ (England), Real Madrid; named: Real_Madrid_ (Spain), Juventus; named: Juventus_ (Italy), Bayern Munich; named: Bayern_ (Germany), and Paris Saint-Germain; named: PSG_ (France). Consequently, in the study there were defined the following variables:

1) Man_Utd_transfers_spending – the variable describes the transfer spending values of Manchester United;
2) Man_Utd_points – the variable describes the number of points collected by Manchester United in a round;
3) Man_Utd_standings – the variable presents the standing that Manchester United placed at the end of a round;
4) Real_Madrid_transfers_spending – the variable describes the transfer spending values of Real Madrid;
5) Real_Madrid_points – the variable describes the number of points collected by Real Madrid in a round;
6) Real_Madrid_standings – the variable presents the standing that Real Madrid placed at the end of a round;
7) Juventus_transfers_spending – the variable describes the transfer spending values of Juventus;
8) Juventus_points – the variable describes the number of points collected by Juventus in a round;
9) Juventus_standings – the variable presents the standing that Juventus placed at the end of a round;
10) Bayern_transfers_spending – the variable describes the transfer spending values of Bayern Munich;
11) Bayern_points – the variable describes the number of points collected by Bayern Munich in a round;
12) Bayern_standings – the variable presents the standing that Bayern Munich placed at the end of a round;
13) PSG_transfers_spending – the variable describes the transfer spending values of Paris Saint-Germain;
14) PSG_points – the variable describes the number of points collected by Paris Saint-Germain in a round;
15) PSG_standings – the variable presents the standing that Paris Saint-Germain placed at the end of a round.

Results

To provide the empirical study, it was necessary to follow the procedure described in previous part of the article. When the variables were collected and ordered in MS Excel file there was a need for opening the file in GRETL software. The first task was to check the stationarity of the processes by using Augmented Dickey-Fuller test (ADF). ADF test verifies the null-hypothesis, which assumes that time series are non-stationary because of the existing unit root. When the value of ADF statistics is lower than the critical value, then the null-hypothesis is rejected. In this case, the alternative hypothesis is approved, which means that the time series is stationary.

Table 1. ADF test results of the analyzed time series in level and first difference

	Intercept				Intercept & Trend			
Variable	**Statistic on level**	**Prob. on level**	**Statistic first diff.**	**Prob. first diff.**	**Statistic: on level**	**Prob.: on level**	**Statistic: first diff.**	**Prob.: first diff.**
Man_Utd_transfers_spending	-7.742	1.88E-07	-7.05115	2.41E-10	-8.1173	8.00E-08	-6.88308	5.38E-09
Man_Utd_points	-3.71684	0.008234	-3.73499	0.003667	-4.04323	0.0165	-3.48998	0.04039
Man_Utd_standings	-3.12528	0.03402	-4.76372	6.06E-05	-3.98765	0.009076	-4.62575	0.0008868
Real_Madrid_transfers_spending	0.4003	0.9830	-5.3340	0.0000	-3.9316	0.0109	-5.2082	0.0001
Real_Madrid_points	-4.5836	0.0008	-7.2707	0.0000	-4.6219	0.0040	-7.2944	0.0000
Real_Madrid_standings	-4.8153	0.0004	-5.8222	0.0000	-3.5578	0.0335	-5.7206	0.0000
Juventus_transfers_spending	-2.0109	0.2823	-4.9026	0.0000	-2.5515	0.3031	-4.9879	0.0002
Juventus_points	-2.1625	0.2204	-9.7906	0.0000	-3.4510	0.0614	-9.8142	0.0000
Juventus_standings	-2.4858	0.1276	-4.1200	0.0009	-2.3207	0.4122	-4.0338	0.0078
Bayern_transfers_spending	-2.2495	0.1889	-22.2205	0.0001	-3.5461	0.0346	-21.9337	0.0000
Bayern_points	-2.5359	0.1069	-9.6368	0.0000	-2.3895	0.3850	-9.4596	0.0000
Bayern_standings	-4.7696	0.0005	-6.4514	0.0000	-4.9081	0.0019	-6.3185	0.0000
PSG_transfers_spending	-3.0405	0.0313	-3.1690	0.0219	-0.8807	0.9566	-3.5764	0.0318
PSG_points	-1.4942	0.5368	-10.5032	0.0000	-2.3971	0.3810	-4.4073	0.0021
PSG_standings	-7.0788	0.0000	-3.5816	0.0062	-3.7224	0.0208	-4.2838	0.0033

Source: Own work.

The ADF test presents that all analyzed variables are stationary in first differences. A significant part of the variables is non-stationary on levels. That is why it is needed to use the first differences of the time series. The ADF test allows analyzing the data from two perspectives – including intercept only and including intercept and time trend. In both cases, the *p-values* of the first differences of variables are significant at a minimum level of acceptance, which 5% is. As a result, the null-hypothesis of the presence of unit root is rejected for the first differences of all presented variables. The causality in Granger-sense can be tested by using the VAR model. However, before building the model, it is desired to check the optimal lag of the pairs of variables. The automatic selection according to GRETL software presents the Table 2. The decision has been made on the BIC criteria.

Table 2. The VAR lag selection for the variables

Relationship		**Intercept**		**Intercept and trend**	
		AIC	**BIC**	**AIC**	**BIC**
d_Man_Utd_transfers_spending	d_Man_Utd_points	8	1	8	1
d_Man_Utd_transfers_spending	d_Man_Utd_standings	7	1	7	1
d_Real_Madrid_transfers_spending	d_Real_Madrid_points	7	5	7	6
d_Real_Madrid_transfers_spending	d_Real_Madrid_standings	7	7	8	8
d_Juventus_transfers_spending	d_Juventus_points	7	1	7	1
d_Juventus_transfers_spending	d_Juventus_standings	3	1	3	1
d_Bayern_transfers_spending	d_Bayern_points	1	1	1	1
d_Bayern_transfers_spending	d_Bayern_standings	1	1	1	1
d_PSG_transfers_spending	d_PSG_points	5	1	5	1
d_PSG_transfers_spending	d_PSG_standings	1	1	1	1

Source: Own work.

The G-cause tests were made on the pairs of the variables – one from the group of financial and one sports performance. The analysis identified the causal relationships between transfer spending and achieved points, and transfer spending and final standings in a round.

Table 3. VAR model of causal relationship results Source: Own work.

Direction of causality		**Intercept**		**Intercept and trend**	
		F-value	**p-value**	**F-value**	**p-value**
All lags of d_Man_Utd_points	d_Man_Utd_transfers_spending	0.62371	0.4359	0.61166	0.4405
All lags of d_Man_Utd_transfers_spending	d_Man_Utd_points	0.80645	0.3763	0.81919	0.3729
All lags of d_Man_Utd_standings	d_Man_Utd_transfers_spending	0.064801	0.8008	0.065094	0.8004
All lags of d_Man_Utd_transfers_spending	d_Man_Utd_standings	1.6938	0.203	1.6023	0.2157
All lags of d_Real_Madrid_points	d_Real_Madrid_transfers_spending	1.8162	0.1604	3.3927	0.0279
All lags of d_Real_Madrid_transfers_spending	d_Real_Madrid_points	3.9991	0.0129	3.2356	0.0329
All lags of d_Real_Madrid_standings	d_Real_Madrid_transfers_spending	1.5188	0.2503	1.7193	0.2301
All lags of d_Real_Madrid_transfers_spending	d_Real_Madrid_standings	4.0955	0.0159	2.9623	0.0728
All lags of d_Juventus_points	d_Juventus_transfers_spending	0.236	0.6306	0.25264	0.619
All lags of d_Juventus_transfers_spending	d_Juventus_points	0.43161	0.5162	0.45286	0.5063
All lags of d_Juventus_standings	d_Juventus_transfers_spending	0.00065461	0.9798	0.00055508	0.9814
All lags of d_Juventus_transfers_spending	d_Juventus_standings	2.3011	0.1398	2.1792	0.1507
All lags of d_Bayern_points	d_Bayern_transfers_spending	0.32911	0.5705	0.29307	0.5924
All lags of d_Bayern_transfers_spending	d_Bayern_points	0.89924	0.3506	0.86694	0.3595
All lags of d_Bayern_standings	d_Bayern_transfers_spending	1.0409	0.3158	1.0111	0.3229
All lags of d_Bayern_transfers_spending	d_Bayern_standings	2.9525	0.0961	2.8669	0.1011
All lags of d_PSG_points	d_PSG_transfers_spending	2.7638	0.1068	2.5823	0.1189
All lags of d_PSG_transfers_spending	d_PSG_points	5.3731	0.0275	5.1953	0.0302
All lags of d_PSG_standings	d_PSG_transfers_spending	0.12614	0.725	0.13921	0.7118
All lags of d_PSG_transfers_spending	d_PSG_standings	0.13417	0.7167	0.1297	0.7214

Table 3 presents the values of the Granger-causality test in the Vector Autoregressive framework for the specific 20 relationships between the pairs of the variables. The test identifies the significance of the cause-effect relationships for the selected football organizations.

Discussion

In the study, there are 4 (out of 20) relevant causal relationships between the financial and sports performance variables in the analyzed period. Two of them are one-direction relationships. This relationship can be observed in the case of transfer spending and standing (Real Madrid) and transfer spending and points (PSG). Additionally, there is one two-direction causal relationships. The significant pair of connection is points and transfer spending values (Real Madrid). However, transfer spending is a cause of sports performance in 3 cases (out of 10). The analysis shows that none of the cases showed a statistically significant relationship between standing and transfer spending. The analysis results cover some of the previous research in this area (Dobson and Goddard, 1998; Kuper and Szymanski, 2018). In such studies, it is possible to indicate the low relationship between transfers and sports performance in the biggest football clubs. Moreover, in the research of English Premier League teams between 1978 and 1997, the relationship appears only in 16% of the cases (Kuper and Szymanski, 2018).

The analysis made in the purpose of the thesis shows there exists a slight relationship between financial (transfer spending values) and sports performance (points and standings) in football in the analyzed sample of European clubs in the selected period. The results of the research show the limited usefulness of the transfer spending values in predicting the achieved number of points or standing in the final table in the both rounds of the season on the example of Manchester United, Bayern Munich, Paris Saint-Germain, Juventus and Real Madrid. In the study, there is only 20% of significant relationships between transfer spending and sports performance (and vice versa). However, there are 33.3% of relationships where transfer spending influence the sports performance results and only 10% where sports performance cause the financial variable. These results correspond to the research results, which conclude that there is no significant or small causal relationship between transfer values and football performance. The study does not reject the causal relationship of transfer spending and standing; and points and transfer spending values; and transfer spending values and points. Moreover, most often, the causal relationship appears in the case of transfer spending and points (2 out of 5 analyzed cases). Additionally, the research does not confirm a significant causal relationship between standing and transfer spending.

As a result, there is possible to refer to the hypotheses presented at the beginning of the paper. The first hypothesis (H1) about the causal relationship between transfer spending and points of the selected football clubs cannot be rejected. This relationship appears in the case of Real Madrid and PSG. Similarly, the second hypothesis (H2) saying that there is a causal relationship between transfer spending and standings of the selected football clubs cannot be rejected. It can be observed in the case of Real Madrid.

Conclusions

From a Granger causality point of view, the conclusion is increasing the values of football players transfers to achieve the best positions or having the best position in a league, has little or no significance. It means that the results show that the practical utilization of them is relatively weak. However, it is recommended to look for the reasons of this situation.

The lack or small relationship between transfer value and sports performance can be an impressive result for some people. It is because the logics suggest that the organizations increase their spending to develop their sports results. It is necessary to identify the reasons of such phenomena. As the literature presents, the potential problems with transfers' success can relate to human nature. The football players' transfers can fail because of the difficulties with acclimatization in the new environment, high pressure from an environment, and other cultural barriers (Kuper and Szymanski, 2018). On the other hand, if the causal relationships between transfer variables and sports performance do not exist, football clubs should invest in research and development centers. They need to consider investing in their own academies and scouting to find the young football talents rather than wasting money on high, ineffective transfers.

The main limitation of the study is the restrictions on access to the data. The author considered to use the market value of the teams in the analysis. However, finding the clubs' market values for a specific round of a season was impossible. Although, that approach contains an idea for further researches in this area. Next limitation was, no possibility for including free transfers as a value of the transfers (Bosman rule) or problem with including the players from academies as the transferred resources. Also, the problem is a gathering the exact values of the transfers values (the significant part of the clubs is not transparent in this area), and the notes in transfers contracts which determine the final transfer cost according to the specific conditions that happen much later than the date of transfer. However, analyzing the transfer values allows deducing that the transfer values for the football players grow rapidly.

Finally, in the author's opinion, the results presented in the article should not be the reasons for aborting the further analyses of the issue. It is strongly advised to continue the researches in the area by expanding the number of the analyzed cases of organizations. Notwithstanding, focusing on the best European clubs is just one

of the available approaches to the problem. Further research can focus on the "middle-class" and "weak" clubs because the results can differ from the results presented in the articles. The following studies can also focus on a specific national football league. Such an approach firstly covers the current thoughts of the economists who consider at the maximum one football league in their studies. Secondly, they did not analyze the best clubs only but include full-range of the available football clubs of a specific league.

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