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Short- and long-term effects of transfers on football clubs' sport performance

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Abstract

One of the important elements of football club quality management is the sale and purchase of player's cards. These activities have important implications for the financial and sport performance of football clubs. The purpose of this paper is to determine how players transfers affect football teams' sport performance. Data on transfers and sport performance came from available databases. They covered the period from 2004/05 to 2018/19 (before the pandemic). For data analysis, a series of hierarchical analysis of regression were conducted. The results show that there is an effect of transfers on football teams' sport performance but it explains a relatively small amount of football club's sport performance. The impact from a transfer in a given year affects sport performance not only in the same year, but also in subsequent years. However, the effect of transfer disappears when control variables are introduced. Thus, the general conclusion from the study is that there is no overall effect of transfers on teams' sport performance. The analyses were conducted only on clubs from the 5 major European leagues and football clubs that were continuously present in the top division. Due to the fact that it included mainly the strongest clubs, the results are relevant for clubs wishing to build up their sporting position on the European market. It is less relevant for weaker clubs. The study consisted of using data over a period of several years, which provides an opportunity to trace the dynamics of change and long-term effects, which is rarely analyzed in the sports literature.

Keywords: sport performance, football transfers

Introduction

Transfers of football players are, next to acquiring players from own football schools, the main source of gaining players for the team. The need to acquire new players is conditioned by many factors as players' injuries (Demczyszak et al., 2018), marketing factors (Andreff, 2018), coaches effect (Karwiński, 2016) or players age (Figueira et al., 2018). The last one seems to play a key role. Football players over 30 years of age lose a large part of their value for biological reasons (Figueira et al., 2018). Increasing or even maintaining the constant level of sport performance requires a constant inflow of "fresh blood". Thus, it is not surprising that the value of transfers on the European market is very substantial. Table 1 presents the values of clubs' transfer expenditures and receipts (in millions of euros) in the seasons from 2004/2005 to 2018/2019. In 15 seasons, the transfer expenditures have more than quadrupled.

Table 1. Total expenditure and transfer revenue (in million euros) of football clubs from the top five European leagues for the seasons 2004/2005-2018/2019

Season	Transfer expenditure	Transfer income
2004/2005	1227,37	927,89
2005/2006	1230,02	854,63
2006/2007	1564,24	936,97
2007/2008	2479,32	1582,87
2008/2009	2298,42	1673,58
2009/2010	2172,97	1642,02
2010/2011	1863,31	1493,60
2011/2012	2141,88	1708,52
2012/2013	2065,74	1552,53
2013/2014	2700,03	1967,59
2014/2015	2808,52	2148,07
2015/2016	3665,13	2905,7
2016/2017	4152,93	3140,75
2017/2018	5635,36	4543,26
2018/2019	5317,83	4025,77

Source: transfermarkt.de

According to transfermarkt.de (2021) the nine clubs have spent more than 1 billion euros on the purchase of new players. Among the clubs that have spent the most on transfers are Manchester City with 1.78 billion euros, Chelsea with 1.76 billion euros and Real Madrid with 1.52 billion euros. In addition, FC Barcelona, Juventus Turin, Manchester United, Liverpool, PSG and Inter Milan were among the clubs with spending in excess of 1 billion euros. Among the clubs that earned the most from the sale of players were Chelsea with 950.99 million euros, AS Monaco with 945.25 million euros and Liverpool with 886.96 million euros (transfermarkt.de, 2021).

The high and growing sums spent on transfers by football clubs were one of the reasons for the introduction of restrictions known as Financial Fair Play. It is a rule adopted by UEFA in 2010 that aims to prevent excessive transfer spending by professional football clubs. Some of them, in order to achieve sporting success, were spending more than their revenues on purchasing footballers, which would threaten their existence in the long run (Dima, 2014; Budzinski, 2014).

Player transfers and football clubs' sport performance

Expenditure on player transfers should be accompanied by measurable benefits for the football clubs. One of them is obtaining high sport performance (places in national or international competitions, number of goals scored, etc.). The literature on this issue indicates that the relationship between transfers and sporting performance is positive. For example, Rohde and Breuer (2016) showed that sport performance as measured by the number of points in league competitions in the top European leagues between 2004 and 2013 was dependent on the amount of

spending on transfers, and these were driven by foreign investors. In the years covered by the analysis, clubs belonging to the 30 richest football clubs won more than 90% of the league titles in the top five European leagues, including all in England, Italy and Spain. This leads to the conclusion that transfer spending is a key element leading to high sport performance, although it is a prerequisite to find an investor that provides the financial resources to make it happen. The literature also points to other important limitations to the positive impact of transfers on sport performance. Andreff (2018), based on transfers from the French market, noted a link between soft budget constraints and the player labor market, where an excessive demand for players with "star" status relative to those with solid league status is evident. The prevailing belief in some clubs is that recruiting such players is the best way to achieve sporting success. In practice, only the clubs with the best sporting results are able to recover the money invested in the purchase of such players, and most of them are regularly doomed to financial losses because sport results do not generate sufficient income to recover these expenses. Based on the results presented, it can be concluded that football clubs should be more driven by players' skills rather than their media value. In a slightly different way, but in the same vein, Kim et al. (2019) indicated that only a detailed analysis of data describing a potential player's game can ensure a successful transfer. In their study, these elements were the number of matches played, goals, assists, shots on goal, fouls and number of passes, and the amount of the transfer fee. The conclusions that can be drawn from research on transfers indicate that they can be an effective way to improve sporting performance, but only if there is a very reliable approach to transfers (Mahdi Nasiri et al. 2018).

The question arises whether such an approach prevails in the practice of football club management. If this is the case then the relationship between transfers and sport performance should be noticeable. However, if many transfers are missed (Andreff 2018) then noticing the relationship between these variables will be impossible.

The purpose of the study is to determine if there is a general relationship between the value of transfers and football teams' sport performance. Given that the effects of transfers may extend over time an additional objective is to determine whether the impact of transfers extends over multiple periods.

Problems of measuring the relationship between transfer spending and sport performance

Problems related to the study of the relationship between transfers of football players and sports performance of football clubs arise from many sources (for review see Mackenzie and Cushion, 2013). The following can be pointed out.

Team effect. Soccer is a team sport which means that a change in the quality of a single player has a limited effect on the performance of the whole team. Similarly, the improvement of a team's sports performance does not necessarily result from the increase of a single player's sports performance. One of the consequences of the team effect may be that the influence of transfers should be more noticeable in the long term than in the short term. Then the cumulative effect of transfers over several years can be seen in the sports performance. This is because transfers from several years may include many players, it means to affect a significant portion of the team.

Ceiling effect. In case of teams with high positions in rankings or high sport effects counted e.g., in the number of goals scored, the increase of the team quality connected with gaining good or good players does not necessarily translate into better sport results. It is impossible to get a better position than the first one. Bayern Munich, for example, has been in first place nine times in the last decade (from the 2010/2011 season to the 2020/2021 season) and has only been in the other place twice (once in second and once in third place). So even a good transfer could not significantly affect the sport performance measured through this variable. On the other hand, a lack of transfers could lead to a decrease in the team's sport performance.

The potency effect. European football clubs and individual national leagues differ significantly in terms of financial strength. In the seasons 2004/2005-2018/2019 (before the Covid-19 pandemic),

the English Premier League clubs spent the highest amount on player transfers, with a total expenditure of €15.19 billion. Clubs participating in other top European leagues also spent significant amounts. The Italian Serie A spent a total of €9.07 billion, the Spanish La Liga €7.36 billion, the German Bundesliga €4.95 billion and the French Ligue 1 €4.75 billion. When a player's card is purchased from a financially weaker league for less money, its impact on sport performance may be greater than a corresponding-sized transfer in a financially stronger league.

The effect of illusory dependence. Sports performance is influenced by a number of factors. Consequently, the occurrence of strong dependence may be the result of not taking into account factors important factors. Many studies have been criticized for failing to take into account variables other than those of interest to the researcher, causing the relationships studied to reach statistically significant results (Rosenzweig 2009).

Material & methods

For clarity in presenting the results, the entire analysis was divided into 3 separate stages. In stage one, the relationship between incoming transfers and sport performance was analyzed. In stage two, control variables were added to the relationship analyzed in stage one. In stage three, analysis was conducted for cumulative transfer volumes. Reducing the impact of the effects described earlier that hinder the study of the relationship between transfers and sport performance was attempted through the following measures. Team effect - taking into account many years back and accumulating transfers from several periods. The ceiling effect - by creating a composite variable including several measures of sport performance. The potency effect by taking into account only the 5 strongest European leagues and clubs that performed in all the years studied. The effect of illusory dependence - including control variables,

Data

The data that was used in the analysis came from Transfermarkt.de. They covered the period from 2004/2005 to 2018/201 for the values of transfers and from 2009/2010 to 2018/2019 for control variables and variables describing sport performance. The data included only the 5 strongest European leagues in order to reduce the error of league diversity described earlier. Additionally, only teams that played in the highest division during the time period covered by the study were included in the study.

Stage 1

The aim of the first study was to determine whether and to what extent incoming transfers (transfer-in) improve the sport performance of football teams.

Dependent variable. The dependent variable was sport performance. Single measures of sport performance are susceptible to numerous limitations (Mackenzie and Cushion, 2013), such as the aforementioned ceiling effect. For this reason, an approach incorporating five different measures of sport performance of football clubs simultaneously was used. Their list and descriptive statistics are presented in Table 2.

Table 2. Measures used to create a composite sport performance variable.

Items	N	Minimum	Maximum	Mean	Standard deviation
National league points scored	350	33.00	100.00	63.96	15.27658
Place gained in the domestic league	350	1.00	18.00	5.91	4.17230
Goals scored	350	27.00	121.00	62.49	18.34917
Goals conceded	350	17.00	74.00	42.45	10.06520
UEFA points scored	350	.00	35.00	11.47	10.52732

Source: own elaboration

In order to obtain a single value of sport performance, factor analysis was conducted assuming the presence of a single factor. The structure of the factor loadings obtained is shown in Table 3. The KMO test was at an acceptable level (KMO=0.741).

Table 3. Factor loadings of variables describing sport performance

Items	Factor loadings
National league points scored	.965
Place gained in the domestic league	-.905
Goals scored	.879
Goals conceded	-.776
UEFA points scored	.729

Source: own elaboration

The analysis explained 73.2% of the total variance of the original variables. All items had high factor loadings, indicating high internal reliability of the new composite variable ("sport performance"). Table 4 provides descriptive statistics characterizing the "sport performance" variable. These statistics confirm that the variable has a distribution close to normal and can be used for further analyses.

Table 4. Descriptive statistics of the sports performance variable

Mean	.0000000
Median	-.0187948
Skewness	.136
Standard error of skewness	.130
Kurtosis	-.563
Standard error of kurtosis	.260
Sample size	350

Source: own elaboration

The independent variables were incoming transfers counted up to five years back (i.e., counting the fifth back season for the 2014/2015 season referred to the 2009/2010 season). Data for transfers came from 15 seasons. Descriptive statistics for these variables are shown in Table 5.

Table 5. Descriptive statistics of transfers

Variable (year)	Mean	Standard deviation	Skewness	Skewness (standard error)	Kurtosis	Kurtosis (standard error)
Transfer 0	55.37	57.90	1.828	.130	4.288	.260
Transfer -1	51.11	55.14	2.047	.130	5.731	.260
Transfer -2	44.73	44.96	1.581	.130	2.571	.260
Transfer -3	40.63	41.74	1.757	.130	3.546	.260
Transfer -4	36.99	39.02	1.949	.130	4.716	.260
Transfer -5	34.20	36.14	2.093	.130	6.121	.260

The results in Table 5 show that the distribution of transfers is highly skewed. In general, this is not surprising given, some of the transfers reach very high values, but most of them are for lower

monetary amounts. In order to eliminate the skewness, the transfer variables were subjected to a logarithmic transformation. This procedure effectively reduced the skewness of the variables, as shown in Table 6. The logarithmically transformed values were used in the follow-up analyses.

Table 6: Descriptive statistics of transfers after logarithmic transformation.

Variable (year)	Mean	Standard deviation	Skewness	Skewness (standard error)	Kurtosis	Kurtosis (standard error)
Transfer 0	1037656,00	.55369	-.625	.130	-.010	.260
Transfer -1	916030,00	.54933	-.621	.131	.173	.260
Transfer -2	771029,00	.53147	-.643	.131	.183	.260
Transfer -3	624202,00	.52229	-.600	.130	.204	.260
Transfer -4	467147,00	.52348	-.607	.130	.288	.260
Transfer -5	322146,00	.54122	-.775	.130	.814	.260

Source: own elaboration

Result of stage 1

A hierarchical linear regression was applied to test the significance of transfers in predicting football teams' sport performance.

The same year transfer-in on the first step on the hierarchical analysis was significant, $R^2=0.22$, $F(1,346)=97.36$, $p<.001$. This result suggests that transfer-in overall significantly account for sport performance. The higher transfer-in the higher sport performance. Next a transfer-in year -1 in the second step accounted for 5% of the variance in the measure of transfer-in on sport performance and was significant $\Delta R^2=.046$, $F(1,345)=21.66$, $p<.001$. Transfer-in year-2 was introduced into analysis in the next step. The transfer-in effect was significant $\Delta R^2=.036$, $F(1,344)=17.81$, $p<.001$. Transfers-in in year -3 and -4 had also significant effects on sport performance (respectively $\Delta R^2=.020$, $F(1,343)=9.92$, $p=.002$; $\Delta R^2=.011$, $F(1,342)=5.55$, $p=.019$). Transfer-in for the year-5 introduced in the last step produced insignificant effects $\Delta R^2=.000$, $F(1,341)<1$. These findings support the assumption that transfers have positive effect on sport performance and these effects are observable with significant time delay.

Conclusion of stage 1

The first stage of the study tentatively indicates that a relationship may exist between transfers and sport performance. This relationship persists not only in the year of transfer but extends 4 years back. Thus, the presence of short- and long-term effects can be concluded. The results for the fifth year back show the disappearance of the transfer effect.

Overall, the results obtained in stage 1 should be treated with caution. Firstly, the studied sample was quite significant, which made it not very difficult to obtain statistical significance (due to the fact that p-values depends on the sample size). Second, only the transfers themselves were considered, without control variables, which may lead to an error of illusory dependence.

Stage 2

In Step 1, statistically significant results were obtained for the relationship between transfers and sport performance. However, these may be the result of an illusory relationship between the variables. The purpose of Step 2 was to determine if the effect of incoming transfers on sport performance persists after the introduction of control variables. The rationale for this stage was to assume that sport performance does not depend solely on transfers.

Dependent and independent variable. The dependent variable was the same as in stage 1. The independent variables were the same as in stage 1.

Control variables. A great many factors can affect football teams sport performance. In many cases, they are highly correlated with each other. In order to avoid high levels of multicollinearity between variables, factor analysis was performed. 11 variables were considered. The list of included variables and the results of the factor analysis performed with Varimax rotation with Kaiser normalization are presented in Table 7.

Table 7: Matrix of rotated principal components (variable related to sport performance)

Variable	Factor 1 (financial strenght)	Factor 2 (players' age)	Factor 3 (coach)
Payroll costs (million euro)	.968		
Operating costs (million euro)	.960		
Sponsorship income (million euros)	.901		
Matchday revenues (million euros)	.914		
TV rights revenue (million euros)	.926		
Number of coaches			.631
Average age of defenders		.425	
Average age of midfielders		.747	
Average age of attackers		.542	-.640
Average age of team staff		.643	.459
Average age of goalkeepers		.962	

Source: own elaboration

Factor analysis resulted in 3 factors explaining 74.6% of the overall variance. Table 7 shows the variable loading on each of the 3 factors (only factor loadings above 0.4 are shown). The analysis produces a quite clean factor structure with items loading on the specific factors. The variance explained by the specific factor is as follows - the first factor identified as club financial strength explains 41.25% of the overall variance. The second factor explaining 22.7% of the total variance is related to the age of the players. The last factor explaining about 10% of the overall variance is mainly related to coach's impact. All these three factors will be used as control variables.

Results of stage 2

Data analysis followed the same pattern as in step 1 except for the introduction of control variables in step one (all three control variables simultaneously). Financial strength of club, age of players and importance of coach on the first step on the hierarchical analysis was significant $R^2=0.52$, $F(1,344)=124.47$, $p<.001$. Transfer-in (the same year) was introduced into analysis in the second step. The transfer-in effect was insignificant $\Delta R^2=.000$; $F(1,343)<1$. Insignificant results were also obtained when transfers from earlier years were introduced into the model. In all cases, the F value was below unity (except for year -3 where it was $\Delta R^2=.002$, $F(1,341)= 1.198$, $p=.275$).

Conclusion of stage 2

When the control variables were introduced, the positive effect of transfers on sport performance disappeared. However, it should be remembered that the analysis conducted took into account each transfer year separately. In this case, the lack of relationship may be related to the presence of a team effect. This will be investigated in stage 3.

Stage 3

The presence of positive transfer effects without control variables and the absence of transfer effects when control variables are included makes transfer effects not easy to interpret. The team effects indicated in the first part of the paper may be a potential reason for this. The team effect can be eliminated by accumulating transfer expenditures over a longer period of time. The purpose of the third stage of the study was to determine if the cumulative value of transfers has an effect on team sports performance.

Variables

Dependent variable was the same as in stage 1 and 2. Independent variable was created as a sum of 6 period transfer expenditures.

Results of stage 3

A hierarchical linear regression was applied to test the significance of cumulative transfers in predicting football team sport performance. The control variable in on the first step on the hierarchical analysis was significant, $R^2=0.52$, $F(3,346)=126.12$, $p<.001$. This result suggests that control variables overall significantly account for sport performance. Next a cumulative transfers in the second step accounted for 0.4% of the overall variance $\Delta R^2=.004$, $F(1,345)=2.789$, $p=.096$ and was insignificant.

Conclusion of stage 3

The effect of cumulative transfers on football clubs sport performance was statistically insignificant. More importantly, the overall effect of explained variance was very small. It means that spending on transfers does not translate into sport performance. This clearly indicates the need to conduct analysis on more detailed data.

General discussion

This paper presented the issue of the effects of incoming transfers on the sport performance of football clubs. Problems associated with the study of this type of relationship and ways to reduce them were indicated. The results of three analyses of the effects of transfers on the football teams' sport performance led to the conclusion that it is relatively easy to demonstrate both the influence and lack of effects of transfers. At the first, methodologically simplest level, it can be seen that transfers are related to sport performance. This confirms the results of previous research (e.g., Andreff, 2018). Moreover, the results of stage 1 of the study indicate that the effects of transfers can be seen with a time lag. Thus, their short- and long-term effects can be claimed. On the other hand, in stage 2 and 3 of the Study, after introducing the control variables, the effect of transfers on sport performance was found to be statistically insignificant. This may be due to several reasons. First, the occurrence of different types of transfers. The first for maintaining sport level, the second for increasing sport level. Only the latter can give results indicating a possible increase in sports performance. Secondly because of the high risk with erroneous transfers. This causes positive and negative effects to average out. Third, the need to accumulate transfers over time. This interpretation is supported by the fact, indicated in Study 3, that once the magnitude of the transfers was cumulated, their effects began to become apparent (however they were insignificant).

Despite the high level of data aggregation in the presented analyses, we can draw some conclusions of an applied nature. Firstly, belief in the magical power of player transfers should be severely limited. In most cases, transfers do not lead to better sport performance. The lack of short-term effects of transfers and the appearance (although at a marginally statistically significant level) of the effect of cumulated transfers suggests that for effective management of a football club a persistent, stable, long-term transfer policy is necessary. Only the clubs that are able to meet such a policy can not only maintain the current sports level but also raise it.

Limitations and future research

The research presented here has several limitations. First, the data on which the analyses were based are selective in terms of the leagues and teams considered. Research sample selection is a persistent problem of sports-related research and significantly influences the results (Carling et al., 2014). Subsequent research may include more leagues with significant variation in financial and sporting potential.

Second, transfer data included only aggregate data. Other authors (e.g., Sokoli, Ibrahimi, and Jahaj, 2020) present the impact of transfers on the performance of the transferred player. Often in a very detailed way (number of goals scored, number of accurate passes). Even if this type of data is not fully accurate, due to the fact that the player's achievements are dependent on the achievements of other team members, it gives the possibility to compare the sports achievements of the transferred player with the team average. In future studies, it would be advisable to operate on disaggregated data that allows capturing the interaction between the achievements of one player with those of other players.

The authors declare that there is no conflict of interests regarding the publication of this paper.

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