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DETERMINANTS OF TRANSFER SUCCESS IN EUROPEAN FOOTBALL: INSIGHTS FROM CROATIA

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Determinanty sukcesu transferów w europejskiej piłce nożnej: wnioski z Chorwacji

Streszczenie

Ze względu na to, że eksport talentów jest kluczowym źródłem dochodów dla klubów z mniejszych lig oraz ma pozytywny wpływ na drużyny narodowe, jest to istotny temat w europejskim futbolu. Wiele klubów z mniejszych lig w Europie polega na dochodach z transferów dla swojej stabilności finansowej. Pomimo licznych prób identyfikacji determinant opłat transferowych, zaskakujące jest to, że nie podjęto jeszcze prób określenia czynników wpływających na sukces zawodnika. Niniejsze badanie ma na celu zidentyfikowanie czynników wpływających na sukces transferu. Wykorzystując dane z chorwackiej ekstraklasy (N = 205), oszacowano modele regresji logistycznej oraz regresji liniowej, aby znaleźć determinanty udanych transferów w europejskim futbolu. Wyniki sugerują, że wartość rynkowa zawodnika w momencie transferu, okno transferowe oraz transfer do jednej z pięciu czołowych lig mają wpływ na prawdopodobieństwo odniesienia sukcesu. Dodatkowo, czynniki klimatyczne (temperatura i opady) również wpływają na sukces transferowanych zawodników. Nie stwierdzono różnic w zależności od narodowości, wieku ani pozycji zawodników. Przedstawiono również wkład, ograniczenia i kierunki przyszłych badań.

Słowa kluczowe: piłka nożna w Chorwacji, determinanty sukcesu transferów, regresja logistyczna, stabilność finansowa.

Abstract

Due to being a key source of income for the clubs in smaller leagues and its positive impact on national teams, talent export in European football is a critical subject. Many clubs from the smaller

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leagues of Europe rely on transfer income for their financial stability. Despite numerous attempts to identify the determinants of transfer fees, surprisingly there have been no attempts to identify the factors that influence a player's success. This study aims to identify the factors that influence a transfer's success. Using data from the Croatian top flight (N=205), a logistics regression and a linear regression model are estimated to find the determinants of successful transfers in European football. The results suggest that the transferred player's market value at the time of the transfer, the transfer window, being transferred to one of the Big 5 leagues influence the probability of being successful. In addition, climate factors (temperature and precipitation) also impact the transferred players' success. No differences were found with respect to the nationality, age or the position of the players. Contributions, limitations and future directions of the study are also presented.

Keywords: Croatian football, determinants of success in transfers, logistics regression, financial stability.

Introduction

The European football market has reached 28.9 billion euros in the 2018/2019 season, with approximately 59% of this total generated by the Big 5 leagues. In addition to Big 5's dominance in the European football market, non-Big 5 top leagues such as Portugal, Russia and Netherlands outweigh non-Big 5 other leagues such as Romania, Serbia and Croatia in terms of revenue generation (Deloitte, 2020). The Big 5 leagues enjoyed significant revenue growth over the past decade thanks to the lucrative broadcasting deals and increasing commercial revenues. On the other side of the table, the smaller leagues in Europe are struggling to increase their revenues and the gap between them and the Big 5 is widening both on and off the field.

While higher revenues do not necessarily guarantee the avoidance of financial problems (Solberg & Haugen, 2010), a comparison of the number of clubs sanctioned for failing to meet Financial Fair Play (FFP) requirements from the Big 5 and other leagues reveals that higher revenues indeed play a crucial role (UEFA, 2023). Smaller leagues' inability to increase their revenues through broadcasting rights, commercial deals and match tickets compels them to become dependent on transfer income. Despite not being able to increase their revenue generation capabilities, smaller clubs are able to generate additional income through transfers due to the increasing revenues in other major leagues. Poli and his colleagues (2019) calculated an inflation rate of 181% in transfer prices between 2011 and 2019. The high inflation in the transfer fees translates into higher transfer income for the clubs from smaller leagues as many of them function as feeder clubs for richer league teams. Although it is an issue in a competitive balance perspective, in terms of financial stability it is valuable for many clubs in European football.

Both the clubs' desperate need to generate additional revenue and players' high willingness to play in the Big 5 leagues cause the talent from smaller leagues

to accumulate in the Big 5 leagues. As Darby (2012) argues, many young players believe that their chances of success are higher in bigger leagues, motivating them to seek opportunities abroad. The clubs from smaller leagues rely heavily on transfer income. Therefore, they are compelled to keep feeding the rich clubs. As Neri and his colleagues (2021) argue, selling players is a key component of football clubs' business models. The success of transfers is crucial to keep the wheels turning as the absence of transfer income could lead to bankruptcy for many clubs in Europe. The continuous failure of transferred players from certain leagues or clubs would eventually result in an apathy towards them in terms of player transfers. Therefore, the transferred players' success is critical both for the selling club and the buying club.

In this context, Croatian football league provides an excellent setup due its ability to generate relatively high transfer income. In the 2017 financial year, Croatian clubs generated the highest transfer revenue as a percentage of their total revenue in Europe with 117% (Obućina, 2019). Besides contributing to the financial survivability of Croatian clubs', the Croatian national team highly benefits from their ability to export talent. In addition to being a significant source of revenue for clubs, exporting talent is also beneficial for national teams. Maguire and Pearton (2000) argue that, especially after the Bosman ruling, talent has been accumulating in England, Germany, Italy and Spain leading to effective player development and success of national teams for the exporting nations. The Croatian men's national football team has consistently been in the top 20 in the world since 2005 (FIFA, 2022) thanks to its players who have mostly been playing in the Big 5 leagues of Europe.

Surprisingly, although there were attempts to identify the factors that impact transfer fees (e.g. Dobson & Gerrard, 1999; Rujig & van Ophem, 2015) and player valuation, to the best of the author's knowledge, no study has been conducted to investigate the factors influential on transfer success. It is important to underline that player transfer fees and player valuation mostly depend on in-game statistics such as goals, assists, interceptions, dribbles etc. However, success of a given transfer or, in other words, the probability of a player being successful depends on other factors. There are numerous examples of players that fail to fit into their new club or that feel homesick. This study aims to identify the factors that have an impact on the success of transfers. Using data, regarding the outgoing transfers, from the Croatian top flight between the 2009/2010 and 2018/2019 seasons, a logistic model is estimated to identify the determinants of a successful transfer. In addition to its contribution to the literature, the results of this study are expected to be beneficial for players, agents, managers and club executives.

The rest of this paper is organized as follows: Section 2 provides a theoretical background for this study and introduces the relevant literature. Section 3 pre-

sents the data set that is used in this study as well as the methodology. Section 4 and Section 5 present the results and discuss the findings along with their practical use and Section 6 concludes the study.

Theoretical Background and Relevant Literature

Revenue Generation and Financial Sustainability in European Football

Revenue generation in European football has been a primary concern for managers and a major area of interest for academics. Numerous studies have investigated the revenue generation capabilities of leagues and clubs (e.g., Solberg & Turner, 2010; Leach & Szymanski, 2015; Aguiar-Noury & Garcia-del-Bario). The majority of the literature focuses on the Big 5 leagues of Europe. Only after the implementation of Financial Fair-Play (FPP) regulations several studies were published about the leagues outside the Big 5 such as Scotland (Maclean, Cordina, & Gannon, 2022), Croatia (Alajbeg, Bubas, & Milovanovic, 2022) and Portugal (Dantas, Borges, & Silva, 2020). In general, the sports economics literature about European football concentrates on the Big 5 leagues creating a significant gap regarding smaller leagues of Europe.

European football clubs have win-maximizing utility functions as argued by Solberg and Turner (2010). Therefore, they prioritize sporting success over financial stability and invest heavily in playing talent even though it does not guarantee sporting success (Perechuda, 2019). Although high revenue generation capabilities do not guarantee to be financially sound, due to the previously mentioned facts, in general the teams of the Big 5 leagues exhibit higher financial stability. The 2014/2015 season was the first season in which numerous teams were sanctioned due to failing to meet the FFP requirements. Between 2014/2015 and 2018/2019, 51 teams were sanctioned by the UEFA Club Financial Control Body (CFCB) and only one of the teams was from the Big 5 (CFCB, 2020). The clubs from smaller leagues are financially more insecure when compared to the teams from the Big 5 leagues.

From 2009/2010 to 2018/2019 the total revenue generated by European football increased from 16.3 billion euros to 28.9 billion euros and the share of the Big 5 increased from 51.5% to 59% in 10 years according to Deloitte Annual Review of Football Finance (2010; 2020) reports. This signifies a 103% increase in total revenues for the Big 5 leagues, while other European leagues increased by about 50%. A significant part of revenue generated by other leagues comes from Russian, Turkish, Dutch, Portuguese and Belgian leagues (for instance, %25 in the 2018/2019 season (Deloitte,2020)). Therefore, the remaining smaller leagues generate even less revenue. The failure of these smaller leagues to

boost their revenues through other sources has led them to become heavily dependent on transfer income, especially after the implementation of Financial Fair Play (FFP).

Table 1 presents the transfer balance for two 5-year periods, before and after the first sanctions of FFP, for the 22 selected European football leagues that are outside the Big 5. Russian, Turkish, Dutch, Portuguese and Belgian first divisions are the highest revenue generating leagues in European football after the Big 5 (Deloitte, 2020). Despite being able to generate significant amounts of revenue both from broadcasting rights and commercial deals, they have all improved their transfer balances significantly from the first five-years periods to the second.

As can be seen from the table, almost all the leagues have improved their balances. Leagues unable to increase their primary revenue sources had to improve their balances to comply with FFP regulations, leading them to heavily rely on transfer income. Therefore, their ability to generate profits from transfers has become crucial for their financial stability. To achieve financial sustainability, clubs in smaller leagues must consistently generate steady transfer income. This is why the fees they get from transfers and also the success of these transfers, due to their probable effects on future transfers, are vital for them.

Table 1
Transfer Balance Across European Leagues

		in million €	
Country	**League**	**09/10 – 13/14**	**14/15 – 18/19**
Russia	Premier Liga	-392.18	24.42
Turkey	Süper Lig	-305.8	-0.187
Portugal	Liga Portugal	329.9	1070
Netherlands	Eredivisie	295.52	566.05
Belgium	Jupiler Pro League	105.53	253.11
Serbia	Super liga Srbije	114.12	133.6
Croatia	SuperSport HNL	104.55	248.77
Switzerland	Super League	106.2	219.42
Norway	Eliteserien	64.35	83.29
Sweden	Allsvenskan	56.72	137.32
Romania	SuperLiga	66.56	88.55
Czech Republic	Fortuna Liga	50.1	46.72
Denmark	Superligaen	49.72	46.33
Scotland	Scottish Premiership	49.47	33.92
Poland	PKO Ekstraklasa	40.96	92.74
Bulgaria	efbet Liga	27.3	16.94

Table 1 (cont.)
Transfer Balance Across European Leagues

		in million €	
Country	**League**	**09/10 – 13/14**	**14/15 – 18/19**
Slovenia	Prva Liga	18.07	39.3
Israel	Ligat ha'Al	15.58	16.16
Belarus	Vysheyshaya Liga	10.7	4.07
Slovakia	Fortuna Liga	50.1	35.7
Hungary	Nemzeti Bajnokság	8.75	21.55
Finland	Veikkausliiga	8.64	6.43

Source: Compiled by the author using Transfermarkt data.

Transfer Fees and Player Valuation

As argued by Kirschstein and Liebscher (2018), players' market values are a key component of clubs' sporting performance as well as their finances. Players are assets for clubs that can be liquidated when needed and as mentioned earlier these assets' financial value is decisive for the financial survivability of teams in non-Big 5 leagues.

Appropriate valuation of players is critical both for the selling and the buying clubs. Due to their importance, there is a vast literature about transfer fees and player valuation in European football (e.g. Dobson, Gerrard & Howe, 2000; Forker, 2005; Garcia-del-Barrio & Pujol, 2020). In the investigation of the determinants of transfer fees and market values, performance variables have received the most attention (Franceschi, Brocard, Follert, & Gouguet, 2023) as would have been expected since the main motivation to conduct a transfer is a player's ability to contribute to the sporting performance. In European football, clubs are constantly competing in domestic and inter-European competitions. Therefore, transferring the right players, at the right time for the right fees can be decisive.

In recent years, another concern in the determination of transfer fees and market values has been player popularity often measured through social media presence, activity and engagement. Social media has become an important medium for improving brand loyalty, brand image and consumers' willingness to pay especially for younger generations (Wallace, Torres, Augusto, & Stefuryn, 2022). Therefore, a player's popularity could provide benefits for the transferring club. For instance, Juventus was able to increase its merchandise sales by 58% and its jersey's value by 252% after transferring Cristiano Ronaldo (KPMG, 2021). Although Cristiano Ronaldo is an outlier, it is common to see substantial increases in merchandise sales after a transfer window which makes fans happy.

Franceschi and his colleagues (2023) provide an extensive review of the literature in the past 30 years. By analyzing 29 selected papers, the authors present a set of explanatory variables that are used to estimate player values in the literature. The set consists of the following ten variables: age and age squared, minutes played, goals, assists, yellow and red cards, appearances, national team status and preferred feet. The variables in the set focus on the sporting performance of the player rather than their popularity or appearance. In general, the literature focuses on the Big 5 leagues with several exceptions such as Greek Super League, Liga Pro (Portugal) and MLS in the United States.

Millions of euros are spent every season to acquire the best talent and clubs often compete with each other for the same players. It is not uncommon to see players that have failed to adapt to a new country due to language barriers, being homesick or simply because of bad weather. Despite the comprehensive attempts to identify the determinants of transfer fees and player values, a question that has not been answered before is: what are the factors that differentiate between successful and unsuccessful transfers?

Undoubtedly, the success of a transfer is crucial for the buyer since the buyer is seeking return for their investment. In addition to the conducted spending on the transfer of a player, clubs also face opportunity costs when choosing one player over the others. Like all other economic agents, clubs also make choices under conditions of scarcity, therefore, the probability of getting higher returns on investment is vital for them. On the other hand, the success of the transfer for the seller is equally important since their future sales are very likely to be affected by the success of their previous sales. The constant failure of transfers from a club or a league might discourage future buyers. Therefore, the determinants of success of a transfer are critical both for the buyer and the seller.

Croatian Football

Despite the notable success it has achieved at the national level in the recent past, the literature on Croatian football is very limited, like on many other smaller European leagues. A relatively comprehensive literature about fandom, fan groups and hooliganism in Croatian football (e.g. Perasović & Mustapić, 2013; Brentin, 2018; Hrstić, Perasović & Mustapić, 2020) is available, however, it is not discussed here due to being beyond the scope of this study. The literature regarding Croatian clubs' management or finances consists of only a few studies which all were written in the past decade.

One of the early studies belong to Širić and Dumančić (2014). The authors investigate human capital in the Croatian first division football clubs. They highlight that both the management structure and the human capital vary across clubs and conclude that clubs with more educated staff achieve better results.

In another study, Tregoures (2017) introduces the club ownership structures and governance in Croatian football. Although he does not discuss club management or finances in particular, he mentions the financial hardship Croatian clubs go through and also underlines the burden publicly owned clubs cause on public budgets.

The only study that investigates Croatian clubs' finances and revenues belong to Alajbeg and his colleagues (2022). Their study has been a critical starting point for this study and has been of great help. The study provides detailed information about the breakdown of revenues regarding selected eight Croatian first division teams which are: GNK Dinamo Zagreb, HNK Hajduk Split, HNK Rijeka, NK Osijek, NK Lokomotiva Zagreb, HNK Gorica, NK Slaven Belupo and NK Istra 1961. Unfortunately, their analysis covers a period between 2018 and 2022, not coinciding with the investigated period in this study, yet providing valuable insights. Firstly, despite generating significant amounts of transfer revenues, all of the clubs made operating losses in the investigated period. Secondly, five of these eight teams, i.e. HNK Hajduk Split, HNK Rijeka, NK Lokomotiva Zagreb, HNK Goric and NK Istra, had higher transfer revenues than their operating revenues. The case of NK Lokomotiva Zagreb is perhaps the most striking one. Even though Lokomotiva generated a transfer revenue about 260% of its operating revenue, they still made losses. Even with their relatively high transfer revenues, Croatian clubs cannot achieve financial stability. The study highlights the importance of transfer revenues for Croatian clubs and argues that Croatian clubs do not have the potential to generate higher operating revenues due to the potential of the Croatian football market and economy. The authors suggest Croatian clubs should focus on developing talent to remain financially viable. Also, as illustrated by Obućina (2019), Croatian clubs generate relatively the highest transfer income in European football. In this context, transfer income is arguably the most important source of revenue for Croatian clubs and also the key factor for their financial sustainability.

Data Collection and Methodology

For the investigation of the determinants of transfer success, a 10-year period before the global pandemic has been chosen between the seasons of 2009/2010 and 2018/2019. The data regarding 205 paid foreign transfers was collected from Transfermarkt, a well-known German website which has been used in academic studies numerous times.

Before introducing the variables that are expected to influence transfer success, it is appropriate to define what a successful transfer is. It is extremely difficult to evaluate players' performance and decide which one is more successful.

A number of factors such as opponents, teammates, leagues affect a player's performance. Even comparing the performance of the same player in two different teams may not be comparable. Therefore, using in-game statistics to asses a transfer's success would be misleading. It does not necessarily mean that a player is less successful than during the previous season because the player scored fewer goals. For instance, a player may increase his goal contribution from 50% to 70% but if his team played worse than the previous season, it would cause the player to score fewer goals in total. Another case might be a team losing all its star players. In the following season, the remaining players' statistics would diminish. However, does this mean all these players were unsuccessful? Instead of focusing on performance measures, which could be highly varying due to the previously mentioned reasons, it is believed that comparing a player's market value in different seasons would be more appropriate to assess his or her performance. Transfermarkt.com utilizes multiple pricing models in addition to the wisdom of its own crowd and since all the market values are computed based on the same methodology, they are consistent over time and across leagues. In this study, success of a transfer is defined as an increase in a player's market value, after a certain period of time after the transfer. Whereas a decrease or no change in a player's market value would indicate an unsuccessful transfer.

Logistics regression has been utilized numerous times in sports economics literature to identify the factors influencing a binary outcome (e.g. Nevill, Balmer & Williams, 2002; Omondi-Ochieng, 2015; Aguado-Méndez et.al, 2021). As Peng, Lee and Ingersoll (2002) argue, logistic regressions are appropriate for defining and testing hypotheses about the link between a dependent binary variable and one or more independent variables. Following Peng, Lee and Ingersoll (2002), a logistic model with multiple independent variables can be estimated as follows:

$$\pi = Probability\,(Y = outcome\ of\ interest|\, X_1 = x_1, X_2 = x_2 \dots X_n = x_n = \\ = \frac{e^{\alpha+\beta_1 x_1+\beta_2 x_2+\cdots\beta_n x_n}}{1+e^{\alpha+\beta_1 x_1+\beta_2 x_2+\cdots\beta_n x_n}} = \frac{1}{1+e^{-f(x)}} \quad (1)$$

Therefore, to identify the determinants of success of a transfer, the logistic model is one of the appropriate choices. The probability of a transferred player being successful one year after the transfer with a market value of MV can be estimated following Equation 2.

$$\pi = Probability(Success_1) = \ (Y = MV_{t+1} > MV_t|\, X_{p1} = x_{p1}, X_{p2} = \\ = x_2 \dots X_{pn}, X_{l1} = x_{l1}, X_{l2} = x_2 \dots X_{lm} \ = x_{lm} \ = \frac{1}{1+e^{-f(x_p,x_l)}} \quad (2)$$

in which x_p and x_l are distinct characteristics of the player and the league that the player is transferred to. With the help of the evidence regarding the

determinants, transfer fees and market values of players provided by the previous studies, the following variables are expected to influence transfer success:

$lnMV_t$: The natural logarithm of the players' market value at the time of the transfer.

Age: Age of the player at the time of the transfer.

Age^2: The square of player's age at the time of transfer. Age is centered (subtracting the mean age from each value) before squaring to deal with correlation between the linear and squared terms to avoid multicollinearity.

PF: A binary variable for the preferred foot of the player which takes the value 1 if the player is right footed and 0 if he is left footed.

Nat: A binary variable which takes the value 1 if the player is Croatian and 0 if the player is foreign.

Pos: Categorical variable for player's position: Goalkeeper / Defense / Midfield / Attack

$Big5$: A binary variable which takes the value 1 if the player is transferred to a team in the Big 5 leagues and 0 otherwise.

$Window$: A binary variable which takes the value 1 if the player is transferred in the summer transfer window and 0 if he is transferred in the winter transfer window.

Hot: A binary variable which takes the value 1 if the transferred player's new city has higher average temperature than the previous one and 0 otherwise.

Wet: A binary variable which takes the value 1 if the transferred player's new city has higher precipitation than the previous one and 0 otherwise.

In general, a player's market value increases instantly when the player is transferred from a smaller league team to a team in one of the Big 5 leagues. This increase does not provide any information regarding the performance of the player or the success of the transfer, it only indicates that the player is more valuable. Even after a complete season, the player's market value can be still higher than their market value at the time of the transfer without even playing a single minute. In the investigation of transfer success, this is likely to cause a bias. To address this bias, Equation 3 is also estimated:

$$\pi Probability = (Success_2) = (Y = MV_{t+2} > MV_t | X_{p1} = x_{p1}, X_{p2} = = x_2 \dots X_{pn}, X_{l1} = x_{l1}, X_{l2} = x_2 \dots X_{lm} = x_{lm} = \frac{1}{1 + e^{-f(x_p, x_l)}} \quad (3)$$

In which the certain period of time to assess the success of the transfer is two years after the transfer instead of one. Therefore, success is defined by two different measures in this study, which are: an increase in a transferred player's market value one year after the transfer, i.e. $Success$ and an increase in a transferred player's market value two years after the transfer, i.e. $Success_2$

In addition to the logistic model, linear regression models are also estimated to investigate the determinants of transfer success. As the dependent variable, change in market value is used. Like in the probabilistic approach, two different measures are used, i.e. ΔMV_1 and ΔMV_2 to investigate a transferred player's success. Unlike in the logistic model, both the change in market value and market value are used in level terms instead of logarithmic terms. A significant number of observations in ΔMV are 0s and 1s, therefore, to avoid the loss in observations, the dependent variable has not been logarithmically transformed.

Results

Table 2 presents the estimation of the results for $Success$ and $Success_2$. The estimation of the results should make it possible to identify the factors that influence the probability of success for a player who was transferred abroad from the Croatian SuperSport HNL.

Table 2
Estimation Results for the Logistics Models of Success

		Model 1		Model 2	
		$Success$		$Success_2$	
		β	p	β	p
$lnMV_t$		0.50	0.00***	0.40	0.01***
Age		0.32	0.65	0.75	0.28
Age^2		-4.48	0.58	-10.75	0.19
Pf		0.12	0.46	0.51	0.26
Nat		0.50	0.26	-0.15	0.71
Pos	Reference Group: Goalkeeper				
	Defense	-0.11	0.88	0.27	0.70
	Midfield	-0.10	0.79	0.28	0.87
	Attack	0.20	0.89	0.10	0.89
$Big5$		0.78	0.08*	0.41	0.36
$Window$		-0.83	0.02**	-0.51	0.12
Hot		-0.49	0.19	-0.59	0.08*
Wet		-0.46	0.22	-0.58	0.10*

***p <0.01 **p <0.05 *p <0.1

For both Model 1 and Model 2, the χ^2 value is 0.00 which indicates the overall significance of the models. When the independent variables are investigated, it could be seen that in both models the player's logarithmically transformed

market value at the time of the transfer, $\ln MV_t$, positively influences success. Players that are valued higher are more likely to be successful within one and two years of their transfer. Furthermore, when marginal effects are estimated, the results illustrate that a 1% increase in the market value of the transferred player increases their probability of success by 8.6% in year one and 7.8% in year two. As the estimation results suggest, both the age and its square are insignificant, therefore, not influential on the probability of a transfer being successful. Being right footed, being Croatian and position are all insignificant on the probability of success for both one and two years after the transfer. Being transferred to a team in the Big 5 leagues seems to increase a player's probability to be successful but the $Big5$ dummy is insignificant in the second model. As argued before, the increase in a player's market value when being transferred to a team in one of the Big 5 leagues could be due to other factors but not his performance, which seems to be the case when the statistical insignificance of $Big5$ in the second model in considered. Transfer window dummy is significant with a negative coefficient in the first model but it is insignificant in the second model. It indicates that players that are transferred in the summer window are less likely to succeed within one year of their transfer. Finally, the binary variables related to the weather are both significant in the second model. Players that are transferred to hotter cities and to cities that have higher precipitation are less likely to succeed after two years.

Table 3
Estimation Results for Linear Regression Models of Success

		Model 1		Model 2	
		ΔMV		ΔMV_2	
		β	p	β	p
MV_t		0.21	0.00***	0.37	0.00***
Age		-0.02	0.96	-0.23	0.78
Age^2		-0.17	0.98	1.64	0.86
Pf		0.01	0.97	-0.33	0.58
Nat		0.25	0.39	0.52	0.29
Pos	Reference Group: Goalkeeper				
	Defense	0.22	0.88	-0.13	0.88
	Midfield	0.55	0.29	0.16	0.86
	Attack	0.33	0.55	0.12	0.89
$Big5$		1.21	0.00***	1.75	0.00***
$Window$		-0.33	0.19	-0.36	0.40
Hot		-0.14	0.59	-0.22	0.61
Wet		-0.52	0.05**	-0.98	0.04**

***p <0.01 **p <0.05 *p <0.1

Table 3 represents the linear regression models' results. In both models, the χ^2 value is 0.00, which indicates the overall significance of the models. The results are generally similar to the logistic models in terms of the significance and insignificance of explanatory variables with some exceptions. $Big5$ dummy is significant for both years, indicating that players that are transferred to one of the Big5 leagues have higher market values, which is as expected. Transfer window dummy is insignificant and the dummy for hotter arrival destinations is also insignificant, whereas the dummy for wetter destinations is significant with a negative coefficient in both models. That indicates that players that are transferred to cities that get more precipitation are adversely affected.

Discussion

As mentioned earlier, transfer income has become a critical source of revenue for the clubs from the smaller leagues in European football. In order for the transfer income to stay as a reliable and sustainable source of income, the determinants of transfer success stand out as a key topic. The transferred players' inability to adapt and perform well in their new teams might jeopardize future transfers from a certain club or a certain league. It should be kept in mind that the determinants of a successful transfer might differ for different leagues.

In the case of players that are transferred from Croatia, a few factors come forward. Firstly, market value is an important determinant of success. Players who have already performed well and acquired a certain level of market value are more likely to succeed than players who are promising but have not increased their market value yet. Furthermore, in general, players from the top teams in the league are valued more, therefore, in the case of Croatia, players that are transferred from GNK Dinamo Zagreb, HNK Hajduk Split and HNK Rijeka might have a higher chance to succeed. In smaller leagues such as the Croatian league, talent usually accumulates in a few teams and is distributed unevenly. Between 2009/2010 and 2018/2019, 91% of the transfer income in the Croatian league was generated by the previously mentioned three teams. The teams that plan to transfer players from the Croatian league could be better off transferring players from these three teams. Secondly, age appears to be an influential factor of success. The results indicate that younger players are more likely to succeed within two years of their transfer. In terms of player development, this result also makes sense since younger players are more likely to improve when they are transferred to a team with better players, better coaches and better facilities. The variable Nat is insignificant in both models, which means that the probability of success is the same for a Croatian player and a foreign player transferred from the Croatian league. 72% of the players in the data set are Croatian

so in general, clubs that transfer players from the Croatian league prefer Croatian players. However, there is no evidence that they are more likely to succeed. Preferred foot and position of the player are both insignificant as well so there is no distinction between lefties and righties or defense, midfield and attack players. $Big5$ variable seems to have impact on success in the first model but, as argued before, its significance might be because of the market value increase players usually enjoy when they are transferred to a team in the Big 5 leagues from a team in smaller leagues. Therefore, due to the inclusion of the second measure of success, the estimation of the second model was necessary. Finally, transfer window is significant in the first model with a negative coefficient which indicates that players that were transferred during the summer window are less likely to succeed within one year of their transfer. Despite its insignificance, the transfer window variable has a negative coefficient in the second model as well. Clubs that are planning to transfer players from the Croatian league might consider making their moves in the winter transfer period instead of the summer window.

Settling into a new team, a new city and a new country could be challenging for everyone not just football players. Despite mankind's ability to adapt, there are times of failure. As Howarth & Hoffman (1984) state, humidity and temperature can have both negative and positive effects on people affecting their sporting performance. The impact of the weather is a subject that has been left out in the sports economics literature. As the results of this study suggest, it could influence player performance and success. Especially as far as the heterogeneity of the weather in Europe is concerned, weather conditions could be a critical factor of success.

In addition to being a vital source of revenue for smaller leagues, exporting talent is also critical for the success of national teams. Despite not being able to achieve any notable success at the club level, Croatian men's national football team has been extremely successful in recent history. After its admittance to UEFA in 1993, the Croatian national team managed to win 2 bronze (1998, 2022) and 1 silver medal (2018) in World Cups and has become one of the dominant teams in Europe (HNS, 2023). Undoubtedly, a key element of Croatia's success at the national level is their players that play in the Big 5 leagues. In order to be able to achieve similar success in the future, talent export is crucial. Players that play with better teammates and against better opponents are able to develop and improve. The Big 5 leagues are the best leagues in European football, therefore, for smaller European countries such as Croatia, exporting talent to the Big 5 leagues is critical for player development, translating into national team success. Furthermore, after retirement such players occasionally start coaching teams and become managers in their second careers. For instance, Croatian national team coaches in the recent history such as: Niko Kovac, Slaven Bilic and

Igor Stimac have all played in the Big 5 leagues in their careers and became managers after retirement (Transfermarkt, 2023). The development opportunities provided by the Big 5 leagues are not just only for players but also for current and future coaches.

Conclusion, Limitations and Suggestions

Due to smaller leagues' inability to increase their revenue generation capabilities, transfer income has become a crucial source of revenue for many clubs from smaller leagues in Europe. High inflation in the European football transfer market in the last decade works in favor of these clubs as the majority of them are able to stay financially stable with the income generated from transfers. In addition to its financial contribution, domestic and national teams benefit from talent export in terms of player and coach development. In this context, the success of transfers comes out as a key issue. When the size of the European football transfer market and the importance of transfers are taken into account, it is surprising that there have been no previous attempts to identify their determinants. This study is the first study which attempts to identify the factors that influence the probability of a player's success after their transfer.

The results of this study may or may not apply to other leagues but it is believed that it could be a good starting point for future studies. An important limitation of this study regards the data set. In addition to not being able to reach a desired number of observations, certain variables such as career appearances at the time of the transfer, goals and assists at the time of transfer could not be included in the model due to the difficulty of collecting such data.

This study shows the perspective of smaller leagues and investigates the determinants of a successful transfer from the Croatian league, however, the case of the Big 5 would be a whole different story. The teams of Big 5 leagues are constantly in a battle with each other about discovering and accumulating talent. Huge amounts of transfer fees are paid every year by the teams of the Big 5 leagues with the hope of improving their playing talent. An alternative way to conduct a similar study would be to investigate the determinants of success for imported talent from other leagues of Europe. What is more, the comparison of several leagues might yield different and interesting results as well as increase the number of total observations.

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AUTHORS' CONTRIBUTIONS

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