



How Could a Football Player Transfer Business be More Successful? A Model-Based on Game Theory Approach

Zhaleh Memari^{1*}, Maryam Esmaeili², Mojzhgan Jafari³

¹ Associate Professor of Sports Management, Department of Sports Management, Faculty of Sport Science, Alzahra University, Tehran, Iran.

² Associate Professor of Department of Industrial Engineering, Faculty of Engineering, Alzahra University, Tehran, Iran.

³ PhD Candidate in Industrial Engineering, Department of Industrial Engineering, K.N Toosi University of Technology, Tehran, Iran.

ABSTRACT

Purpose: Nowadays, the football business and players' transfer have become integral in managing professional sports, which has become a pivotal part. Therefore, clubs try to sell, buy, and remove players. This study aimed to model the transfer of players based on the game theory approach. The Nash bargaining equilibrium was determined for the player, seller, and buyer club.

Methodology: A model was represented in terms of clubs' profit, players' wages, and bargaining power of each party using a generalized Nash bargaining model. By solving the model, the optimal transfer fee was calculated.

Findings: Results show that the transfer fee depends on the bargaining power of clubs. Bargaining power of players and factors may be the rank of the source club in the previous season, the financial value of the source club, age, nationality and height of the player, performance of the player in the last season, number of substitutes in and out of the field, number of goals and assistances, number of yellow, red, and double yellow cards in previous season all are experimental factors on the bargaining power of players. Notably, the factors may differ in different leagues and various posts played by players.

Originality: Game theory is a theoretical framework for solving conflicts in political and social affairs. This study used this framework to solve the problem of transferring football players from one club to another, which is unique.

Keywords

Bargaining Game
Football Club
Nash Bargaining Equilibrium
Optimization

Article type

Original Article

Received: 2022/12/25

Accepted: 2023/05/09

How to cite this article:

Memari, Z., Esmaeili, M., & Jafari, M. (2644). How Could a Football Player Transfer Business be More Successful? A Model-Based on Game Theory Approach. *Sports Business Journal*, 3(2), 13-26. <https://doi.org/10.22051/sbj.2023.42401.1067>



1. Introduction

Football's attractiveness has grown, such that its economic, social, cultural, and even political effects have led most countries to seek further benefits from the sport's development (Zhang et al., 2018). Over recent years, management in many professional football clubs has become more complex and focused on financial matters (Morrow & Howieson, 2014). Today's football clubs can transfer players, recruit a good coach, create a good team combination, hire a specific player, and make money, but they must consider affording these expenses. At the same time, it is necessary to do so based on a particular frame and in line with FIFA Regulations. Creating a national determination, providing financial resources, and developing knowledge, managerial and technical skills are undeniable necessities in sports development (Pouyandekia & Ghafari, 2021).

Research on football player transfer refers to half a century ago. Andreff and Staudohar (2000) know that transferring the players and the fees is the primary source of the club's income (Andreff & Staudohar, 2000). Macedo et al. (2022) present a model for estimating the transfer fees of professional footballers using advanced performance metrics and machine learning (Macedo et al., 2022). Some believe that stadium facilities, such as cleanness, reception parking space, and design, have affected the number of spectators, ticket sales, income, and bargaining power (Wakefield & Sloan, 1995). Moreover, common sense says clubs should try to increase their long-term income. Memari et al. (2021) argued that the importance of human resources index, managerial expertise, marketing, software, legal and economic infrastructure were the factors influencing the promotion of club power (Memari et al., 2021). Thus, human resources are considered the essential internal resource. To this end, they must promote the club and trust their fans instead of hiring star players and attracting spectators for only a short while (Wu et al., 2012). Sloane (1971) believes that ticket sales, TV broadcasting rights, and receiving transfer fees are the primary income sources of clubs (Sloane, 1971). show that the advertisement has most effect on ticket price and so on revenue from a game (Norouzi et al., 2018). Researchers have emphasized that contract length should be one of the main determinants of transfer fees.

Most papers in this regard have focused on the impact of players' characteristics, such as their position, age, and experience, on transfer fees (Feess & Muehlheusser, 2003). In addition, it has been shown that the most expensive soccer player's transfer fee is not random and can be explained using correct independent variables. Nevertheless, in the frequently used methods, the ultimate satisfaction of every party is not possible and making a deal that everyone agrees with is highly time-consuming. Despite all the efforts to reach an agreement with which all the parties are satisfied, it is highly time-consuming and, on several occasions, impossible; it often seems that one of the parties will benefit more from this transfer. Thus, the main question is how we can reach an agreement to maximize the benefits of all parties. Game theory provides specific solutions in cases where the dispute between the parties is such that reaching a compromise is usually tricky and timely. It shows how to reach an agreement in controversies. The Game theory technique can also provide an excellent solution to shorten the path and achieve maximum satisfaction for the parties. Therefore, future research is needed to investigate this question. Based on the sport and

bargaining literature, we attempted to answer this question: How could a football player's transfer business be more successful?

2. Literature review

The transfer fee is between the seller clubs' introductory price and the buyer club's maximum rate. Every time a professional player internationally transfers for a fee, all the clubs contributing to the player's education and training receive a solidarity contribution of up to 5% of the agreed transfer fee. Windfall gains from the transfer fee premiums might also alleviate the pressure on public subsidies to clubs, which are still an essential source of revenue for many clubs in minor leagues (Depken & Globan, 2021).

Football often acts as a catalyst for popular and international unity or dispute. It can also involve big money if we consider the European Super League model on the scale of the US Major Leagues (Macedo et al., 2022). Barbuscak (2018) showed that the Productivity or popularity of clubs had been shown to justify the high amounts of money spent on football players in the top European teams. The players' race and the years left on their contracts significantly affect the transfer fees (Garcia-del-Barrio & Pujol, 2016). Memari et al. (2020) argued that decision tree algorithm is recommended when predicting players' prices with the club fixed budget and the neural network is the most appropriate method when the budget is varied (Memari et al., 2020).

Research has primarily focused on players' physical condition and their records in match variables in player transfers. Still, optimizing the negotiation results and methods for reaching the best agreement in this regard has not been scarcely investigated. Without fans in the stadium, all teams will experience reduced revenues, putting downward pressure on transfer fees and premiums. Today, the impact on transfer fee premiums from declining TV revenues is not symmetric to the effects of increasing TV revenues (Depken & Globan, 2021). The differences in players' wages depend on their performance. Accordingly, the variance of their performance in the previous contract years is low. However, a player's effort is another practical factor measured according to a player's total distance and several great runs. Of course, results have shown that, unlike classic ideas, several excellent terms and tackles affect the player's recorded value, not its changes (Wicker et al., 2013). Estimation results were showed that tactics factor 0/33, technical factor 0/13, fitness factor -0/34, social acceptance factor 0/19 and club brand factor 1/45. Therefore, except physical fitness index which have inversely related to pricing, other index have direct related with superior league football players pricing (Izadyar et al., 2016). Moreover, the community valuation predictor and its significance to the regression equation suggest that the opinion of the soccer community is of particular importance. The community prediction is also a strong indicator of the actual market value of the player or how much any club is willing to pay for him in the transfer fee.

Some factors have the most significant impact on the purchase of domestic brand sports products include products quality, products price, appearance and packaging, domestic brand loyalty, fashion and variety of products, social factors, brand awareness and accessible to products access (Hasanzadeh et al., 2022). Ante (2019) considers that social media, advisors, and outfitters are believed to affect transfer fees significantly (Ante, 2019).

Therefore, player market value and the existence of external advisors positively impact transfer fees, and the presence of outfitters has an explanatory value. In certain studies, age, number of clubs, national games of a player, the number of goals, and a player's ability to lead a team (captain or not) have been considered a player's performance criteria (Frick, 2011). Metelski (2021) mentioned that the player's age and position are the most critical factors when investigating Poland's football league. The transfer of players aged 21 or lower is the highest transfer fee, and transfer forwards are the most common transfer (Metelski, 2021). Barbuscak (2018) considers that variables such as the number of Google searches, the number of years on contract left, the community valuation of a player, the number of goals and assists, and the player's race significantly influence the transfer fee paid for a player. Other researchers have reported additional factors for a player's value, including a player's age and experience and his (Bryson et al., 2013; Franck & Nüesch, 2008; Lehmann & Schulze, 2008; Lucifora & Simmons, 2003; Wallace, 1988) presence in national games (Bryson et al., 2013; Franck & Nüesch, 2008; Lehmann & Schulze, 2008; Lucifora & Simmons, 2003; Wallace, 1988) presence of the player in national games (Bryson et al., 2013; Franck & Nüesch, 2008; Lehmann & Schulze, 2008; Lucifora & Simmons, 2003). Participating in European competition (Hübl & Swieter, 2002), presence of a player in the world cup (Simmons & Deutscher, 2012), a player's nationality (Bryson et al., 2013; Franck & Nüesch, 2008), total time played by the player (Bryson et al., 2013; Sauer & Hakes, 2007), years left of their contract (Krautmann & Oppenheimer, 2002) several goals, being two-footed and their performance (Bryson et al., 2013) their overall performance (Bryson et al., 2013) are all effective on a player's value. The effect of the factors mentioned above is different in subgroups divided by continents, the league in which players work, and the post they play. Ante (2019) suggests that generalized models across playing positions and heritage may only provide basic information but no practical use. Without considering the high subgroups, general models give no applicable but available information (Ante, 2019).

It seems as if the effects of several factors mentioned above in the negotiating process can make it more sophisticated. Since general bargaining models are developed (Dias & Vetschera, 2019; Gerchak & Khmel'nitsky, 2019; Hart & Mas-Colell, 1996; Nash Jr, 1950), in this case, the Game theory may be a good tool for modelling the problem in reality and obtaining the best policy (strategy). Szymanski and Smith (1997) note that transfer fee is a determining factor in a bargaining process (Szymanski & Smith, 1997). Numerous scientists have dedicated themselves to investigating practical factors on transfer fees and players' value. Footballer attributes as static characteristics such as age and height, or dynamic ones, such as pass completions and shots on target, may address the demands of clubs, media pundits, and gaming developers (Wakelam et al., 2022).

Some have studied the player's transfer fee during a bargaining process without considering mathematic models in terms of club profit function, bargaining power of each party, and the optimal transfer fee (Carmichael & Thomas, 1993). The player, seller, and buyer club's characteristics affect each party's bargaining power (Carmichael & Thomas, 1993; Dobson et al., 2000; Speight & Thomas, 1997). The following research has determined that "external alternatives" from the bargaining process, namely suggestions of other clubs, affect game payoff only when at least one prefers their payoff to Nash's bargaining answer. Thus, clubs' available "external alternatives" do not influence game

payoff and transfer fees. If one of the sellers or buyer clubs prefers to pay off “external alternatives”, it will not participate in the bargaining (Shaked & Sutton, 1984).

A few researchers have argued that clubs' bargaining power depends on several factors, including stadium capacity, goal average, position in the previous season, and management changes (Carmichael et al., 2011; Swanepoel & Swanepoel, 2016; Van den Berg, 2011). Others have reported further factors, namely the club's total income and advertising income. There is a correlation between the buyer club's bargaining power and the player's value. Furthermore, certain elements, like the number of goals, assists, player's popularity, race, years left of their contract, and the essential player's value. Furthermore, certain elements, like the number of goals, assists, player's popularity, race, years left of their contract, and the essential player's value (Swanepoel & Swanepoel, 2016).

Furthermore, certain elements, like the number of goals, assists, player's popularity, race, years left of their contract, and the essential player's value (considered by sites, such as the transfer market), affect transfer fees (Barbuscak, 2018). Factors including a player's age and height, in addition to the skilling factors, such as the number of dribbles, passes leading to the goal, their activities in social networks, the number of their followers, and the existence of counsellor affect the results of the bargaining (Ante, 2019). Other researchers have divided transfers into four groups, namely the low performance of the player and low transfer fee, (2) low performance of the player and high transfer fee, (3) high performance of the player and high transfer fee, and (4) high performance of the player and low transfer fee. Researchers have explained that clubs do not have to buy just group 4 because of their different purpose and policies. They have also mentioned that the factors affecting a player's market value differ based on his position (Kim et al., 2021). To our knowledge, bargaining implementation in the football player transfer business has not been considered.

3. Methodology

The transfer may be temporary, soldier, or permanent. This paper focused on permanently transferring players with a contract with a club. Primarily, buyer and seller clubs negotiate on the transfer fee. The player must pass the buyer club's medical tests. Because of the importance of the player's health for the club, the transfer does not probably occur if they do not pass these tests. In this paper, a model was represented in terms of clubs' profit, players' wages, and bargaining power of each party using a generalized Nash bargaining model. By solving the model, the optimal transfer fee was calculated. The player's transfer fee may depend on some factors such as the bargaining power of the club and player and factors like the position of the source club in the previous season, the financial value of the source club, age, nationality, and height of the player, and the player's performance in the last season. The number of substitutes in and out of the field, the number of goals and assists, and the number of first and second yellow cards and red cards in the previous season may affect the player's bargaining power. Notably, the factors may differ in different leagues and various posts played by players. The final part was allocated to the conclusion of the findings.

3.1. Mathematical model

In this section, we should briefly explain mathematical optimization (modelling) before proposing the mathematical model and data analysis. Mathematical optimization was as follows:

Max $f(x)$

S.t.

$$(1) \quad h_i(x) = 0$$

$$(2) \quad g_j(x) \leq 0$$

$$(3) \quad x \subseteq R_n$$

x and $f(x)$ are decision variables and the objective function in sequence. (1) and (2) are constraints of the model. In mathematical programming, the objective function is to determine the optimal decision variables (x^*) to reach their maximum regarding the constraints (feasible region). If x^* is the optimal local solution of $f(x)$, then $\nabla f(x^*) = 0$ (First-order necessary conditions for unconstrained optimization). Second-order necessary conditions for unconstrained optimization: suppose $f(x):R_n \rightarrow R$ is two times differentiable; if x^* is a local maximum of $f(x)$ which satisfies the first-order necessary condition, then $\nabla^2 f(x^*)$ is negative semidefinite. Sufficient conditions for unconstrained optimization: $f(x):R_n \rightarrow R$ is two times differentiable and x^* is a local maximum of $f(x)$ which satisfies the first and second necessary conditions when $\nabla^2 f(x^*)$ is negative definite (Bazaraa et al., 2013).

3.2. Proposed model

This article intends to obtain the optimal transfer fee using optimization methods. Given that the bargaining theory is a branch of optimization topics in which some parties bargain over the division of certain goods, this theory can also be used for player transfer. First, using the bargaining theory, we model the player transfer with the existing constraints, and then, using optimization methods, we obtain the optimal solution. Therefore, the bargaining model is applied to the problem of the transfer of a football player as follows:

Consider m decision-makers with the bargaining power of (γ_i) for each the Nash bargaining model is as follows when the profit function of i^{th} decision-makers and the minimum profit expected of i^{th} decision-maker who participates in bargaining are (π_i) and (RP_i) respectively.

$$(4) \quad \text{Max } Z(\pi_1, \pi_2, \dots, \pi_m) = (\pi_1 - RP_1)^{\gamma_1} \cdot (\pi_2 - RP_2)^{\gamma_2} \dots (\pi_m - RP_m)^{\gamma_m}$$

S.t.

$$(5) \quad \pi_i \in \Omega_i \quad \forall i = 1, 2, \dots, m$$

$$(6) \quad \pi_i \geq RP_i \quad \forall i = 1, 2, \dots, m$$

$$(7) \quad 0 \leq \gamma_i \leq 1 \quad \forall i = 1, 2, \dots, m$$

$$(8) \quad \sum_{i=1}^m \gamma_i = 1$$

(Ω_i) is a feasible region of i^{th} decision-makers' profit. In the transfer of players, the added value by buying a player has considered as buyer club's income and the lost weight by selling player is regarded as seller club's expenses (Gulbrandsen & Gulbrandsen, 2011) so that:

$$(9) \quad \text{Increased value of seller club} = IR - S_B$$

$$(10) \quad \text{Lost value of buyer club} = DR - S_S$$

IR and DR in (9) and (10) indicate increasing buyer club's income and decreasing seller club's income caused by the player's transfer. This difference in clubs' revenue bears on different ticket sale issues, absorbing sponsors before and after transfer. S_B and S_S are respectively received a wage of the player in buyer and seller clubs. S_B has not been determined during the transfer.

Moreover, the profit of each club defines as follow:

$$(11) \quad \pi_B = IR - S_B - TF$$

$$(12) \quad \pi_S = TF + S_S - DR$$

Where π_B and π_S respectively indicate the profit function of buyer and seller clubs. RP_i shows the expected value of external alternatives of clubs out of the bargaining process (it means suggestion of other clubs). In other words, both sides of bargaining expect their profit of the process to be equal to different ideas; otherwise, they wouldn't participate in the bargaining. RP_S and RP_B are used respectively for seller and buyer clubs. γ^B and γ^S also indicate respectively bargaining power buyer and seller clubs. Replacing (11) and (12) in (4) and (6), the bargaining model changes to:

$$(13) \quad \text{Max } Z(TF) = [(IR - S_B - TF) - RP_B]^{\gamma_B} [(TF + S_S - DR) - RP_S]^{\gamma_S}$$

S.t.

$$(14) \quad IR - S_B - TF \geq RP_B$$

$$(15) \quad TF + S_S - DR \geq RP_S$$

Where $0 \leq \gamma_B \leq 1$, $0 \leq \gamma_S \leq 1$ & $\gamma_B + \gamma_S = 1$.

3.3. Optimal transfer fee

The proposed model is a nonlinear programming model and has necessary and sufficient conditions to obtain its solution. The first and the second time derivations of the objective function are as follows:

$$(16) \quad \frac{\partial Z}{\partial TF} = -\gamma_B(IR - S_B - TF - RP_B)^{\gamma_B-1}(TF + S_S - DR - RP_S)^{\gamma_S} + (IR - S_B - TF - RP_B)^{\gamma_B}\gamma_S(TF + S_S - DR - RP_S)^{\gamma_S-1}$$

$$(17) \quad \frac{\partial^2 Z}{\partial TF^2} = \gamma_B(\gamma_B - 1)(IR - S_B - TF - RP_B)^{\gamma_B-2}(TF + S_S - DR - RP_S)^{\gamma_S} + (-\gamma_B)(IR - S_B - TF - RP_B)^{\gamma_B-1}\gamma_S(TF + S_S - DR - RP_S)^{\gamma_S-1} + (-\gamma_B)(IR - S_B - TF - RP_B)^{\gamma_B-1}\gamma_S(TF + S_S - DR - RP_S)^{\gamma_S-1} + (IR - S_B - TF - RP_B)^{\gamma_B}\gamma_S(\gamma_S - 1)(TF + S_S - DR - RP_S)^{\gamma_S-2}$$

The proposed model is a concave function to TF because $(-\gamma_B)$, $(\gamma_B - 1)$ and $(\gamma_S - 1)$ are negative, and consequently, the model is a convex optimization. Therefore, the solution which satisfies the first-order condition is the global solution of the unconstrained model.

$$(18) \quad \frac{\partial Z}{\partial TF} = 0 \Rightarrow TF = \gamma_S(IR - S_B - RP_B) - \gamma_B(S_S - DR - RP_S)$$

The obtained TF would be optimal, TF^{NBS} (Nash equilibrium), if it satisfies (14) and (15). By replacing the obtained TF^{NBS} in all constraints we have:

$$(19) \quad \begin{aligned} IR - S_B - \gamma_S(IR - S_B - RP_B) + \gamma_B(S_S - DR - RP_S) &\geq RP_B \\ \Rightarrow (1 - \gamma_S)(IR - S_B - RP_B) + \gamma_B(S_S - DR - RP_S) &\geq 0 \\ \Rightarrow \gamma_B(IR - S_B + S_S - DR - RP_B - RP_S) &\geq 0 \end{aligned}$$

$$(20) \quad \begin{aligned} \gamma_S(IR - S_B - RP_B) - \gamma_B(S_S - DR - RP_S) + S_S - DR &\geq RP_S \\ \Rightarrow \gamma_S(IR - S_B - RP_B) + (1 - \gamma_B)(S_S - DR - RP_S) &\geq 0 \\ \Rightarrow \gamma_S(IR - S_B + S_S - DR - RP_B - RP_S) &\geq 0 \end{aligned}$$

In (19) and (20), γ_B and γ_S are nonnegative. Therefore $IR - S_B + S_S - DR - RP_B - RP_S$ is positive because the bargaining system's profit should be more than the sum of both sides' minimum expected profit; otherwise, the bargaining mechanism doesn't make sense.

According to (18), the bargaining power of clubs, increasing or decreasing their income and their expected profit, all affect the TF^{NBS} .

Based on (18), S_B (amount of player's contract in buyer club) effects on TF^{NBS} whereas S_B is determined by the bargaining power of buyer club and player (γ_B, γ_P). In other words, the bargaining power of player effects on S_B and as a result, on TF^{NBS} .

The transfer of the player makes sense when:

$$(21) \quad \pi_B \geq RP_B \Rightarrow IR - S_B - TF \geq RP_B \Rightarrow TF + S_B \leq IR - RP_B$$

Therefore, a minimum amount of buyer club can pay for a transfer fee, and the player's wage is $X = IR - RP_B$. There would be eight cases for the bargaining power of clubs and players. Consider the case in which the bargaining power of player and seller club is more than buyer club ($\gamma_P > \gamma_B, \gamma_S > \gamma_B$), the buyer club should pay a high transfer fee to the seller club. If the seller club uses a maximum of its bargaining power and takes all X for itself, the buyer wouldn't have a budget to assign to the player, and the transfer doesn't occur probably. In this case, player and seller are set in prisoner's dilemma conditions because their simultaneous selfishness may cause failure in transfer and consequently no payoff for both.

The best case for seller club certainly is the case in which their bargaining power is more than the buyer club, and the bargaining power of the player is less than the buyer clubs ($\gamma_P < \gamma_B, \gamma_S > \gamma_B$) because the seller club may ask a large amount of TF without worry, and it may get most of X for itself.

In the same way, the best case for players is the case in which the bargaining power of buyer club is more than seller club and less than them ($\gamma_P > \gamma_B, \gamma_S < \gamma_B$) because the seller club gains low TF, and a player may take most of X for themselves. These two cases are not favorable for the buyer club because their payoff is small in these cases. If the bargaining power of the buyer club is more than both players and seller clubs ($\gamma_P < \gamma_B, \gamma_S < \gamma_B$) they pay less transfer fee (TF) and less wage (S_B) and take most of X for themselves. Other cases in which two clubs or buyer clubs and players don't have any privilege in comparison to each other can be considered too. Figure 1 shows the approximate proportion of S_B changes to γ_S . As it is seen in Figure 1, the transfer of players occurs until $\gamma_S \leq \bar{\gamma}_s$ where $\bar{\gamma}_s$ is the maximum value of bargaining power of seller club that the transfer will be done; otherwise, the transfer of player doesn't occur probably because the buyer club cannot afford convenience the player and seller club simultaneously. The diagram of the relation between the transfer fee and the player's bargaining power is drawn similarly.

According to (18), the transfer fee depends on the players' wage, and the player's wage depends on their bargaining power. Our finding is in line with (Carmichael et al., 2011; Dobson et al., 2000; Frick, 2011; Speight & Thomas, 1997).

4. Conclusion

Nowadays, the transfer of players is integral in managing professional sports. This paper initially modeled a football player's transfer via the Nash bargaining model. This model concerns the profit of the buyer and seller clubs, bargaining power, and a player's wage. By solving the model, we could obtain the optimal transfer fee of a player. The bargaining power of clubs affects the increase or decrease in their income; their expected profit, determined before the bargaining process, influences the optimal transfer fee. The buyer club considers the player's wage depending on his bargaining power, affecting the optimal transfer fee. According to the proposed model (4 equation) and the player's bargaining

power, we concluded that the optimal transfer fee depends on the bargaining power of buyer and seller clubs; it might decrease or increase the income of seller and buyer clubs. Clubs have been involved in player transfers for many years. They use various methods to better transfer players, including their personal experiences. This study showed that better negotiations could be done using the Game Theory and bargaining model to obtain the best result for all parties. If bargaining is used, the parties to the contract will have a chance of success and maximum profit.

We could recommend an additional investigation to answer the following questions: what player-associated criteria affect the decrease or increase in seller and buyer clubs' payment and the optimal transfer fee? Why do clubs sometimes agree on an amount less or more than the optimal transfer fee? What occurs if clubs agree on more than the optimal transfer fee.

Disclosure statement and funding

The authors declare no potential conflicts of interest. The present study received no financial support from any organization or institution.

Acknowledgment

We would like to give special thanks to all the participants in this study.

References

- Andreff, W., & Staudohar, P. D. (2000). The Evolving European Model of Professional Sports Finance. *Journal of Sports Economics*, 1(3), 257-276. <https://doi.org/10.1177/152700250000100304>
- Ante, L. (2019). *Determinants of Transfers Fees: Evidence from the Five Major European Football Leagues*. <https://doi.org/10.13140/RG.2.2.18356.91526/1>
- Barbuscak, L. (2018). What Makes a Soccer Player Expensive? Analyzing the Transfer Activity of the Richest Soccer. *Augsburg Honors Review*, 11(Article 5), 65-83. https://idun.augsburg.edu/cgi/viewcontent.cgi?article=1004&context=honors_review
- Bazaraa, M. S., Sherali, H. D., & Shetty, C. M. (2013). *Nonlinear Programming: Theory and Algorithms*. Wiley. <https://books.google.com/books?id=nDYz-NIpluEC>
- Bryson, A., Frick, B., & Simmons, R. (2013). The Returns to Scarce Talent: Footedness and Player Remuneration in European Soccer. *Journal of Sports Economics*, 14(6), 606-628. <https://doi.org/10.1177/1527002511435118>
- Carmichael, F., McHale, I., & Thomas, D. (2011). Maintaining market position: team performance, revenue and wage expenditure in the English premier league. *Bulletin of Economic Research*, 63(4), 464-497. <https://doi.org/10.1111/j.1467-8586.2009.00340.x>
- Carmichael, F., & Thomas, D. (1993). Bargaining in the transfer market: theory and evidence. *Applied Economics*, 25(12), 1467-1476. <https://doi.org/10.1080/00036849300000150>
- Depken, C., & Globan, T. (2021). Football transfer fee premiums and Europe's big five. *Southern Economic Journal*, 87(3), 889-908. <https://doi.org/10.1002/soej.12471>

- Dias, L., & Vetschera, R. (2019). Multiple local optima in Zeuthen–Hicks bargaining: an analysis of different preference models. *EURO Journal on Decision Processes*, 7(1), 33-53. <https://doi.org/10.1007/s40070-018-0089-0>
- Dobson, S., Gerrard, B., & Howe, S. (2000). The determination of transfer fees in English nonleague football. *Applied Economics*, 32(9), 1145-1152. <https://doi.org/10.1080/000368400404281>
- Feess, E., & Muehlheusser, G. (2003). The Impact of Transfer Fees on Professional Sports: An Analysis of the New Transfer System for European Football. *The Scandinavian Journal of Economics*, 105(1), 139-154. <http://www.jstor.org/stable/3440925>
- Franck, E., & Nüesch, S. (2008). Mechanisms of Superstar Formation in German Soccer: Empirical Evidence. *European Sport Management Quarterly*, 8(2), 145-164. <https://doi.org/10.1080/16184740802024450>
- Frick, B. (2011). Performance, Salaries and Contract Length: Empirical Evidence from German Soccer. *International Journal of Sport Finance*, 6(2), 87-118. https://econpapers.repec.org/article/jsfintjsf/v_3a6_3ay_3a2011_3ai_3a2_3ap_3a87-118.htm
- Garcia-del-Barrio, P., & Pujol, F. (2016). Economic Valuation of Football Players through Media Value. 9. <https://www.easm.net/download/2008/a9edd75b825b62a96f30b670bf1b4838.pdf>
- Gerchak, Y., & Khmelnitsky, E. (2019). Bargaining over shares of uncertain future profits. *EURO Journal on Decision Processes*, 7(1), 55-68. <https://doi.org/10.1007/s40070-019-00095-4>
- Gulbrandsen, A. M., & Gulbrandsen, C. M. (2011). *Valuation of football players: A complete pricing framework*. [Master Project, NHH: Norges Handelshøyskole]. <https://www.semantic scholar.org/paper/Valuation-of-football-players-%3A-a-complete-pricing-Gulbrandsen-Gulbrandsen/5ab23b3fb52ed528dad955413ea8dc3f47606c48>
- Hart, S., & Mas-Colell, A. (1996). Bargaining and value. *Econometrica: Journal of the Econometric Society*, 64(2), 357-380. <https://doi.org/10.2307/2171787>
- Hasanzadeh, S. J., Nobakhat, F., & Zare Abandansari, M. (2022). Customers' Buying Intention on Sports Products Domestic Brands. *Sports Business Journal*, 2(2), 217-227. <https://doi.org/10.22051/sbj.2022.41975.1058>
- Hübl, L., & Swieter, D. (2002). Der Spielmarkt in der Fußball-Bundesliga. In *Sportökonomie* (pp. 105-126). https://doi.org/10.1007/978-3-663-07711-4_6
- Izadyar, M., Memari, Z., & Mousavi, M.-H. (2016). Pricing Equation for Iranian Premier League Football Players. *Journal of Economic Research (Tahghighat- E- Eghtesadi)*, 51(1), 25-40. <https://doi.org/10.22059/jte.2016.57595>
- Kim, Y., Bui, K. H. N., & Jung, J. J. (2021). Data-driven exploratory approach on player valuation in football transfer market. *Concurrency and Computation: Practice and Experience*, 33(3), e5353. <https://doi.org/10.1002/cpe.5353>
- Krautmann, A. C., & Oppenheimer, M. (2002). Contract Length and the Return to Performance in Major League Baseball. *Journal of Sports Economics*, 3(1), 6-17. <https://doi.org/10.1177/1527002502003001002>
- Lehmann, E., & Schulze, G. (2008). What Does it Take to be a Star? – The Role of Performance and the Media for German Soccer Players. *Applied Economics Quarterly (formerly: Konjunkturpolitik)*, 54(1), 59-70. <https://doi.org/10.3790/aeq.54.1.59>
- Lucifora, C., & Simmons, R. (2003). Superstar Effects in Sport: Evidence From Italian Soccer. *Journal of Sports Economics*, 4(1), 35-55. <https://doi.org/10.1177/1527002502239657>
- Macedo, A., Ferreira Dias, M., & Mourão, P. R. (2022). A literature review on the European Super League of football – tracing the discussion of a utopia? *International Journal of Sport Policy and Politics*, 14(3), 563-579. <https://doi.org/10.1080/19406940.2022.2064895>

- Memari, z., Hoda, K., & Safaie, A. (2020). The Valuation of Football Players with Data Mining Technique (Case Study: Esteghlal Club). *Sport Management Journal*, 12(3), 735-757. <https://doi.org/10.22059/jsm.2019.262922.2128>
- Memari, Z., Rafei Boldaji, S., & Pouyandekia, M. (2021). How is the Football Schools Franchise Using a Valuable Approach to Revenue-Generating Capacity in Iranian Football Clubs? *Sports Business Journal*, 1(1), 31-44. <https://doi.org/10.22051/sbj.2021.36864.1008>
- Metelski, A. (2021). Factors affecting the value of football players in the transfer market. *Journal of Physical Education and Sport*, 21(2), 1150-1155. <https://doi.org/10.7752/jpes.2021.s2145>
- Morrow, S., & Howieson, B. (2014). The New Business of Football: A Study of Current and Aspirant Football Club Managers. *Journal of Sport Management*, 28, 515-528. <https://doi.org/10.1123/jsm.2013-0134>
- Nash Jr, J. F. (1950). The bargaining problem. *Econometrica: Journal of the Econometric Society*, 18(2), 155-162. <https://doi.org/10.2307/1907266>
- Norouzi, M., Memari, Z., & Askarifar, K. (2018). Optimal Revenue Policy based on Ticket Price Using System Dynamics Approach; Case Study Iran Football Premier League. *Journal of Economic Research (Tahghighat- E- Eghtesadi)*, 53(1), 209-224. <https://doi.org/10.22059/jte.2018.65091>
- Pouyandekia, M., & Ghafari, M. (2021). How Can the Cooperation Between Federation and League Organizations Develop a Talent Program? Case study: German Football TID & TED Program. *Sports Business Journal*, 1(2), 129-148. <https://doi.org/10.22051/sbj.2022.38855.1021>
- Sauer, R., & Hakes, J. (2007). The Moneyball Anomaly and Payroll Efficiency: A Further Investigation. *International Journal of Sport Finance*, 2(4), 177-189. <https://ideas.repec.org/a/jsf/intjsf/v2y2007i4p177-189.html>
- Shaked, A., & Sutton, J. (1984). Involuntary unemployment as a perfect equilibrium in a bargaining model. *Econometrica: Journal of the Econometric Society*, 52(6), 1351-1364. https://econpapers.repec.org/article/ecmemetrp/v_3a52_3ay_3a1984_3ai_3a6_3ap_3a1351-64.htm
- Simmons, R., & Deutscher, C. (2012). The economics of the World Cup. In L. H. Kahane & S. Shmanske (Eds.), *The Oxford Handbook of Sports Economics. Vol. 1: The Economics of Sports* Oxford: Oxford University Press. <http://dx.doi.org/10.1093/oxfordhb/9780195387773.013.0023>
- Sloane, P. (1971). The Economics of Professional Football: The Football Club as a Utility Maximiser. *Scottish Journal of Political Economy*, 18(2), 121-146. <https://doi.org/10.1111/j.1467-9485.1971.tb00979.x>
- Speight, A., & Thomas, D. (1997). Football league transfers: a comparison of negotiated fees with arbitration settlements. *Applied Economics Letters*, 4(1), 41-44. <https://doi.org/10.1080/758521830>
- Swanepoel, M., & Swanepoel, J. (2016). The correlation between player valuation and the bargaining position of clubs in the English premier league (EPL) *International Journal of Economics and Finance Studies*, 8(1), 209-225. <https://doaj.org/article/d8636de01bf049758254cf1b7ea62e83>
- Szymanski, S., & Smith, R. (1997). The English Football Industry: profit, performance and industrial structure. *International Review of Applied Economics*, 11(1), 135-153. <https://doi.org/10.1080/02692179700000008>
- Van den Berg, E. (2011, August 11). *The Valuation of Human Capital in the Football Player Transfer Market: An investigation of transfer fees paid and received in the English Premier League*. [Master Thesis, Financial Economics, Erasmus School of Economics].

https://www.academia.edu/1010237/The_Valuation_of_Human_Capital_in_the_Football_Player_Transfer_Market

- Wakefield, K., & Sloan, H. (1995). The Effects of Team Loyalty and Selected Stadium Factors on Spectator Attendance. *Journal of Sport Management*, 9(2), 153-172. <https://doi.org/10.1123/jsm.9.2.153>
- Wakelam, E., Steuber, V., & Wakelam, J. (2022). The collection, analysis and exploitation of footballer attributes: A systematic review. *Journal of Sports Analytics*, 8(1), 31-67. <https://doi.org/10.3233/JSA-200554>
- Wallace, M. (1988). Labor market structure and salary determination among professional basketball players. *Work and Occupations*, 15(3), 294-312. <https://doi.org/10.1177/0730888488015003004>
- Wicker, P., Weimar, D., Prinz, J., Deutscher, C., & Upmann, T. (2013). No Pain, No Gain: Effort and Productivity in Professional Soccer. *International Journal of Sport Finance*, 8(2), 124-139. <https://fis.dshs-koeln.de/de/publications/no-pain-no-gain-effort-and-productivity-in-professional-soccer>
- Wu, S.-H., Tsai, C.-Y., & Hung, C.-C. (2012). Toward Team or Player? How Trust, Vicarious Achievement Motive, and Identification Affect Fan Loyalty. *Journal of Sport Management*, 26(2), 177-191. <https://doi.org/10.1123/jsm.26.2.177>
- Zhang, J., Kim, E., Mastromartino, B., Qian, Y., & Nauright, J. (2018). The sport industry in growing economies: critical issues and challenges. *International Journal of Sports Marketing and Sponsorship*, 19, 00-00. <https://doi.org/10.1108/IJSMS-03-2018-0023>



چگونه نقل و انتقال بازیکنان فوتبال می تواند کسب و کاری موفق تر باشد؟ مدلی مبتنی بر رویکرد نظریه بازی ها

ژاله معماری^۱، مریم اسماعیلی^۲، مؤگان جعفری^۳

^۱دانشیار مدیریت ورزشی، گروه مدیریت ورزشی، دانشکده علوم ورزشی، دانشگاه الزهراء(ع)، تهران، ایران.

^۲دانشیار گروه مهندسی صنایع، دانشکده فنی، دانشگاه الزهراء(ع)، تهران، ایران.

^۳دانشجوی دکتری مهندسی صنایع، گروه مهندسی صنایع، دانشگاه صنعتی خواجه نصیرالدین طوسی، تهران، ایران.

کلیدواژه

بازی چانه زنی
باشگاه فوتبال
بهینه سازی
تعادل چانه زنی نش

نوع مقاله

پژوهشی اصیل

چکیده

هدف: امروزه تجارت فوتبال و نقل و انتقالات بازیکنان در مدیریت هم افزای ورزش حرفه ای، به یک بخش اساسی تبدیل شده است. بدین منظور، باشگاه ها سعی در فروش، خرید و کار گذاشتن بازیکنان خود دارند. این مطالعه با هدف مدل سازی انتقال بازیکنان بر اساس رویکرد نظریه بازی ها انجام و تعادل چانه زنی نش برای باشگاه بازیکن، فروشنده و خریدار تعیین شد.

روش: مدلی بر حسب سود باشگاه ها، دستمزد بازیکنان و قدرت چانه زنی هر طرف با استفاده از مدل چانه زنی تعمیم یافته نش ارائه شد. با حل مدل، هزینه انتقال بهینه محاسبه شد.

یافته ها: نتایج نشان داد هزینه انتقال به قدرت چانه زنی باشگاه ها بستگی دارد. قدرت چانه زنی بازیکنان بر اساس رتبه باشگاه مبدا در فصل قبل، ارزش مالی باشگاه مبدا، سن، ملیت و قد بازیکن، عملکرد بازیکن در فصل گذشته، تعداد تعویض ها در و خارج از زمین، تعداد گل ها و پاس گل ها، تعداد کارت های زرد، قرمز و دو کارت زرد در فصل قبل، است. قابل ذکر است که عوامل ممکن است در لیگ های مختلف و پست های مختلفی که بازیکنان بازی می کنند متفاوت باشد.

اصالت و ابتکار مقاله: نظریه بازی چارچوبی نظری برای حل تعارضات در امور سیاسی و اجتماعی است. این مطالعه از این چارچوب برای حل مسئله انتقال بازیکنان فوتبال از یک باشگاه به باشگاه دیگر استفاده کرده که در این قبیل پژوهش ها روشی منحصر به فرد است.

تاریخ دریافت: ۱۴۰۱/۱۰/۰۴

تاریخ پذیرش: ۱۴۰۲/۰۲/۱۹