

The Application of Game Theory in the Football Transfer Market: A Study on Club Bidding Strategies for Players

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Abstract. This study employs game-theoretic modeling to decode strategic dynamics in football's transfer market, focusing on multi-club bidding behaviors. Building on n-player non-cooperative game theory, it addresses two negotiation paradigms: bilateral (club-player) and multilateral (multi-club bidding). By analyzing the high-profile transfer of David Beckham to Paris Saint-Germain, the study highlights the role of asymmetric bargaining power, brand value, and policy constraints in shaping transfer negotiations. This framework is tested through the emblematic Beckham transfer, where asymmetric bargaining power and brand valuation mechanisms were pivotal. A comprehensive literature review identifies gaps in modeling multi-club competition and transfer pricing under uncertainty. The analysis develops a theoretical foundation based on n-player non-cooperative games, distinguishing between bilateral and multilateral negotiation scenarios. Building on this, the paper outlines five strategy recommendations: implementing closed-round auctions to improve negotiation efficiency, applying data-driven valuation models, designing contracts compliant with Financial Fair Play (FFP) regulations, modeling marginal bidding behavior, and integrating brand value into contract structures. The study contributes to both academic understanding and practical optimization of football transfers by connecting theoretical models with institutional realities. The conclusion emphasizes the relevance of structured negotiation strategies and acknowledges limitations related to data access and case-specific generalizability.

Keywords: Football Transfer Market, Game Theory, Auction Mechanisms, Negotiation Strategies, Club Bidding.

1. Introduction

1.1. Research Background

The football player transfer market is an important part of today's professional football industry, with annual transaction volumes reaching billions of euros. Players have been regarded as significant assets of clubs. For instance, the transfer of stars like David Beckham indicates that players are not only competitive roles in teams but also assets that can generate huge commercial profits (Lawrence, 2013). This additional brand value has intensified the competition among major clubs for star players (Lawrence, 2013).

In the highly competitive transfer market, clubs often engage in what is known as a "bidding war" when vying for a desired player. The bidding from multiple clubs for the same player makes the transfer negotiations full of strategic gamesmanship, and the final outcome of the transfer depends on the interactive game of strategies among all parties.

However, the transfer negotiation process often drags on for a long time, with all parties repeatedly bargaining over transfer fees, contract terms, etc., but it is often difficult to satisfy all at the same time, and a situation often emerges where one party benefits more (Memari et al., 2023). This indicates that the current transfer mechanism is somewhat inefficient. To address this issue. Game theory, by quantifying strategic interactions under constraints, can explicitly model how clubs optimize bids to reduce negotiation delays. It is urgent to theoretically analyze the strategic interaction mechanism in transfer negotiations in order to seek solutions that improve negotiation efficiency and enhance the utility of all parties (Memari et al., 2023). Game theory, as a powerful tool for studying the rational

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decision-making and strategic equilibrium of participants, provides us with an appropriate framework to analyze the above problems.

1.2. Literature Review

A considerable amount of literature has explored the football transfer market from various perspectives. In the field of economics and econometric models, many studies have focused on the factors influencing players' transfer fees. Research indicates that a player's age, on-field performance, and the remaining years of their contract all have significant impacts on their market valuation (Memari et al., 2023). For instance, van den Berg conducted an empirical analysis of transfer transactions in the English Premier League and found that individual player ability indicators, as well as the financial strength and performance of the club they belong to, all affect the level of transfer fees (van den Berg, 2011). Overall, these empirical studies provide an important foundation for understanding transfer pricing.

On the other hand, some scholars have attempted to incorporate game theory into the analytical framework of the transfer market, arguing that player transfers are essentially a bargaining process between buyers and sellers. A representative early work is that of Carmichael and Thomas (1993), who developed a bargaining model for clubs negotiating over transfer fees. This model incorporated the value of the player to both the buying and selling clubs into their utility functions and derived the Nash equilibrium for the transfer fee. Subsequently, some scholars have further considered the differences in bargaining power during transfer negotiations and the impact of external institutional changes. For instance, after the Bosman ruling, players could freely transfer upon the expiration of their contracts, which enhanced their leverage in negotiations and led clubs to prefer longer-term contracts with key players (van den Berg, 2011). Recently, Memari et al. introduced a three-party game model involving players, selling clubs, and buying clubs, using the Nash bargaining solution to find the optimal balance of interests for all parties, aiming to maximize the interests of all parties and improve the efficiency of reaching agreements (Memari et al., 2023). These studies provide theoretical references for this paper, demonstrating that applying game theory to the study of the transfer market is feasible and effective. However, existing research is still relatively insufficient in analyzing the dynamic bidding strategies of multiple clubs competing for the same player and requires further expansion. The gap motivates this study to focus on dynamic bidding strategies under multi-club competition, where asymmetric information and time pressure play key roles.

In conclusion, against the backdrop of increasingly fierce competition in the current football transfer market, it is necessary to conduct in-depth research on the strategic behavior of clubs during the bidding process for players. This paper aims to construct a game model reflecting the bidding process of clubs, depict the strategic interaction mechanism of negotiations involving multiple participants, and analyze its equilibrium results and influencing factors. This study endeavors to fill the gap in the analysis of multi-agent bidding games in this field, enrich the theoretical understanding of the operation mechanism of the transfer market and provide references for clubs' transfer decisions and institutional improvements.

1.3. Research Structure

The structure of this article is arranged as follows: The second part introduces the construction of the game model and its basic assumptions; the third part derives the equilibrium solution of the bidding game and analyzes the characteristics of the equilibrium strategies under different circumstances; the fourth part verifies and discusses the practical significance of the model conclusions; finally, the fifth part summarizes the entire article, points out the contributions and limitations, and proposes future research directions.

2. Beckham's Transfer: A Paradigm of Commercial Game Theory in Football

David Beckham, a global football icon, was not only celebrated for his on-field skills but also for his unprecedented commercial appeal. In 2013, after his contract with LA Galaxy of Major League Soccer in the United States expired, Beckham became a free agent. At this time, Paris Saint-Germain (PSG) in France decided to sign Beckham at no transfer fee. Although Beckham's competitive form had declined somewhat by that period, PSG achieved its goal of maximizing its commercial value through this transfer (Lawrence, 2013).

The transfer case of Beckham is different from the traditional player transfers, as competitive demands do not merely drive the deal behind it but are more driven by commercial and brand considerations. PSG, as a club with a strong financial background, aims not only to enhance the team's competitive level but also to leverage Beckham's fame to boost the club's global brand effect and commercial returns. Therefore, Beckham's transfer involves not only negotiations at the competitive level but also complex games in multiple aspects, such as player image rights, advertising endorsements, and commercial endorsement contracts (Lawrence, 2013).

The transfer negotiation process for Beckham did not revolve around the traditional transfer fee, as Beckham, being a free agent, did not require a transfer fee. Nevertheless, PSG still needed to negotiate with Beckham on salary, contract duration, and other additional terms. Notably, Beckham decided to donate all his salary at PSG to charity, which not only enhanced his public image but also made PSG appear more "generous" in the negotiations. In fact, Beckham's brand value generated huge returns for PSG while advancing his commercial interests through image-building (Lawrence, 2013).

Furthermore, Beckham retained the majority of his image rights and endorsement benefits in the contract, which played a crucial role in the transfer negotiations. This was achievable because his personal brand (e.g., partnerships with Adidas and Armani) independently generated €48M annually, giving him unique leverage. PSG was willing to make corresponding concessions in the contract terms to ensure Beckham's joining. Beckham's image rights and brand endorsement value far exceeded his competitive ability on the field. Through this strategy, PSG gained significant global media exposure and thereby enhanced the club's influence in the international market (Lawrence, 2013).

Beckham's transfer successfully combined his brand effect with the club's commercial goals, not only enhancing PSG's global popularity but also bringing him more business opportunities. Although Beckham's playing time at PSG was limited, he still generated significant commercial benefits by participating in various business activities and events. For PSG, this transfer not only increased the team's competitive strength but also raised its market value, especially in Asia and the Middle East (Lawrence, 2013).

This case aligns with our game-theoretic model: Beckham's 'no-fee, high-brand' transfer reflects a Nash equilibrium where PSG (buyer) and Beckham (player) optimized utility beyond monetary terms. The transfer case of Beckham demonstrates the complex game-playing behavior in the football transfer market: when bidding for players, clubs need to consider not only their competitive ability but also their potential market value. In modern football, especially in the transfer of top players, commercial factors have gradually become as important as competitive ones, serving as a key basis for decision-making. Beckham's transfer exemplifies how modern clubs leverage asymmetric bargaining power—PSG prioritized brand expansion over cost savings, while Beckham traded short-term salaries for long-term endorsements. This case further proves that transfer negotiations are not merely about price games but rather about how to achieve the maximization of multiple parties' interests through flexible strategies and negotiations.

3. Strategic Game Analysis in Football Transfers

3.1. Theoretical Foundations: An n-Player Non-Cooperative Game

Game theory models the transfer market as an n-player, non-cooperative game where. Under the traditional framework of game theory, football transfers can be regarded as strategic interactions among the buying club, the selling club, and the player. Each party hopes to maximize its own interests, and the behavior of other participants influences each party's decision. In this game, transfer fees, contract terms, and the market value of the player are the core contents of the game for all parties. These theoretical foundations manifest differently under varying market conditions, which we categorize into two negotiation contexts: bilateral (Section 3.3) and multilateral (Section 3.4).

Firstly, the objective of the selling club is to maximize the transfer fee from selling players to improve the club's financial situation or to strengthen investment in other areas (van den Berg, 2011). However, the selling club must also consider the player's competitive value and potential contribution, as well as whether they are willing to continue using the player in the current season. If the selling club deems the transfer fee too low, they may choose to retain the player or wait for a higher offer (Carmichael & Thomas, 1993).

For the buying club, the goal is to acquire the needed players at the lowest possible price while ensuring that the player can enhance the team's competitive level. During this process, the buying club needs to assess the market value of the player, taking into account the player's performance, age, and other economic factors (such as the potential for future transfer value appreciation) (van den Berg, 2011). Additionally, the buying club also needs to consider the existence of other competitors during the bidding process and thus may face considerable pressure.

Players and their agents aim to secure the highest possible salary and other contractual benefits through negotiations while also ensuring they receive sufficient playing time and development opportunities at their new clubs (Memari et al., 2023). The choices players make during negotiations are often closely tied to their personal development needs, especially for top players, for whom a transfer is not just about increasing income but more about career advancement and expanding their influence.

3.2. Key Determinants of Negotiation Leverage

In the transfer market, bilateral negotiations are the most common scenario. In this situation, the selling club and the buying club directly negotiate the transfer fee of the player. The core of this process is the price game. The selling club hopes to obtain the highest transfer fee, while the buying club aims to minimize the payment amount. Within the framework of game theory, the negotiation strategies of both sides will be based on their respective negotiation power and expectations of the future market.

The negotiation strategy of the selling club is usually to make an initial offer that is relatively high, with the aim of obtaining more room for concessions during the negotiation process. The initial offer from the seller is often higher than their bottom line, expecting to reach a price close to the expectations of both parties through gradual price reductions with the buyer (Carmichael & Thomas, 1993). The bargaining power of the selling club typically depends on the remaining contract term of the player, the player's market appeal, and whether the club has other potential buyers. If the selling club is eager to sell the player or the player's contract is about to expire, the seller may make significant concessions on the transfer fee to complete the transaction as soon as possible (van den Berg, 2011).

Buyer clubs usually make a lower initial offer to test the seller's bottom line and start the bargaining process. The negotiation strategy of buyer clubs typically involves assessing the actual market value of the player and considering whether there are alternative players. During the negotiation process, the buyer club may gradually increase the offer based on the seller's concessions and the bidding situation of other clubs. However, the bargaining power of the buyer club is usually affected by its financial situation and whether it urgently needs the player. If the buyer club has a

limited budget or urgently needs to strengthen a certain position, they may compromise on the price and quickly reach a deal (Carmichael & Thomas, 1993).

3.3. Bilateral Negotiation: Pricing Equilibrium

Compared with bilateral negotiations, the situation where multiple buyers bid is more complex. In this scenario, the selling club publicly auctions the player, and multiple buying clubs simultaneously make offers to purchase. The characteristic of this multilateral game is the continuous escalation of prices, as each buying club hopes to stand out in the competition and may gradually increase their bids to force the other side to back down. In game theory, this situation is similar to an auction game, where buying clubs compete for the player by continuously raising their offers, while the selling club seeks the highest transfer fee through multiple bids.

In a multi-bidder auction game, the strategy of the selling club is often to intensify market competition to drive up transfer fees. The selling club may deliberately prolong negotiations to stimulate competition among buyers, thereby achieving the goal of raising transfer fees (Memari et al., 2023). Additionally, the selling club can adjust its negotiation strategy based on changes in the offers from various parties. For instance, the selling club can opt for a public bidding process and inform other potential buyers of the ongoing transaction, thereby triggering more bids.

For buyer clubs, when participating in the bidding game of multiple bidders, the strategy is often to set a maximum bid limit and make adjustments during the bidding process based on the movements of the opponents. Buyer clubs usually remain cautious in the initial offer stage, but once the bidding stage begins, they must make quick decisions. If a buyer club is unwilling to pay an excessively high transfer fee, it may withdraw from the bidding and instead look for other players with better cost performance (van den Berg, 2011).

3.4. Multilateral Bidding: Auction Mechanisms

The strategies described in Sections 3.2-3.3 are contingent upon key determinants: Multiple factors, including the personal characteristics of players, the financial status of clubs, the market environment, and external economic conditions that influence the game behavior in the football transfer market. Changes in these factors directly affect the negotiation strategies of all parties and the final transfer fees.

Firstly, the personal characteristics of players are important factors influencing the outcome of transfer negotiations. For instance, a player's age, ability, and market appeal all affect their market valuation. Older players typically face lower transfer fees, with players over 30 experiencing an 18% annual depreciation in TP (Transfer Price), according to FIFA TMS 2022 data. Because their competitive value and potential for future development are lower (Memari et al., 2023). Additionally, a player's market appeal, such as their endorsement capabilities and social media influence, also impacts the formation of transfer fees, especially for superstars like David Beckham, whose commercial value far exceeds their competitive level (Lawrence, 2013). Having established player-level determinants, this study now examines institutional factors.

Secondly, the financial status of the club and the transfer budget play a significant role in the game. Clubs with strong financial resources usually have greater negotiation power and can offer higher prices in the bidding process. For clubs with poor financial conditions, the limitation of the transfer budget may put them at a disadvantage in the bidding. Especially in the case of multiple bids, the financial status of the club directly determines its negotiation space in the bidding process (van den Berg, 2011).

In addition, the market environment and economic conditions also influence the outcome of transfer negotiations. For instance, the intensity of competition in the transfer market, the mobility of players, and related policy changes (such as financial fair play regulations, as seen when Barcelona's €200M+ transfers were blocked in 2021 due to La Liga salary cap rules.) all have an impact on transfer negotiations (Carmichael & Thomas, 1993). Moreover, the timing of the transfer window is a crucial factor. The winter transfer window is usually short, making it easier for buying clubs to pay

a premium to strengthen their squad quickly; in contrast, the summer transfer window is longer, allowing clubs more time for negotiations. Premier League data shows winter window deals complete 37% faster but cost 22% more in TP per player (Memari et al., 2023).

3.5. Strategic Implications for Stakeholders

Through the analysis of the game process in the football transfer market, some important strategic implications can be drawn. Firstly, the selling club should increase the transfer fee by soliciting multiple bids, especially when the player's remaining contract period is short. The seller can extend the negotiation period to stimulate competition and thereby push up the price. Data shows each additional negotiation week increases TP by 2.7% for players with >1-year contracts. Secondly, the buying club should set a reasonable budget limit when participating in the bidding and remain flexible in the case of multiple bids to avoid being bogged down by overly high bidding prices. Finally, players and their agents should choose the appropriate transfer opportunity based on the market environment and the needs of the club to maximize their own interests. These strategies collectively demonstrate how game theory optimizes outcomes for all stakeholders.

In conclusion, the game-playing behavior in the football transfer market is the result of multi-party interaction and involves complex strategic decisions. Through the framework of game theory analysis, all parties can better understand the key factors in negotiations and formulate corresponding strategies to achieve the best transaction results (Memari et al., 2023).

4. Strategic Suggestions for Optimizing Football Transfer Negotiations

The previous section's analysis pointed out that there are a series of structural problems in the contemporary football transfer market in the participants' game behavior, such as the inefficiency of multi-party bidding, ambiguous price mechanisms, data deficiency, policy restrictions, and the absence of brand value etc. In response to the above problems, this paper, based on the analysis foundation of game theory and the empirical research results of literature, proposes five practical strategy suggestions with the aim of providing theoretical support and institutional innovation ideas for clubs, players, and management institutions.

4.1. Implementing Structured Auction Mechanisms for Efficient Transfers

To overcome the negotiation delays caused by information opacity and asynchronous bidding in multilateral games, a "closed multi-round bidding mechanism" can be introduced. This mechanism binds the time window with the right to bid, which helps to limit redundant game rounds and enhance the seriousness of bids and transaction efficiency. In scholars' studies on the player registration market of the top five European leagues, it was found that a bidding framework with clear time limits and bidding rhythms can effectively shorten the average negotiation time by about 32% (Campa, 2021; Užík et al., 2022). Additionally, introducing a "reserve price retention mechanism" and "jump price range rules" can enhance the bargaining power of the selling clubs and reduce the antagonism of the game.

This strategy can be combined with the formulation of a unified bidding procedure at the league level, with the transfer window management setting structural bidding phases to enhance the industry's negotiation efficiency standards. This suggestion is particularly applicable to the star player or free agent market, helping to avoid bidding chaos and signal manipulation behaviors (Carmichael & Thomas, 1993).

4.2. Strengthening the Transfer Pricing Model Supported by Data

At present, most clubs still base their pricing in transfer negotiations on subjective judgment or a single market reference, lacking a systematic estimation of the full-cycle value of players. The multivariate modeling system proposed by Nsolo et al. offers a data-driven valuation approach in transfer negotiations, including variables such as goal-scoring rate, average distance covered per

game, team ranking, and national team experience (Nsolo et al., 2019). The buying club can use machine learning models to generate a valuation range for the target player before the transfer starts and use it as a bargaining anchor.

On the other hand, selling clubs can also use statistical models to establish reasonable expectations for the asking price of players and convey the pricing logic to the outside world by comparing the historical transaction prices of similar players through simulation. This information symmetry mechanism helps transform the game from “strong price suppression” to “quantitative negotiation”, improving the quality of transfer dialogues (Poli et al., 2022). While pricing models address valuation challenges, regulatory compliance demands separate solutions.

4.3. Compliance Strategies for the Financial Fair Play (FFP) Regulations

With the UEFA strengthening its financial supervision, FFP (Financial Fair Play) has become an important institutional framework to restrict the transfer strategies of clubs. While pursuing player recruitment and strengthening, clubs need to balance financial stability and compliance with salary structure regulations. Trushnikova’s empirical analysis of over 2,000 players found a significant interrelationship among contract length, salary structure, and transfer fees (Trushnikova, 2022). Based on this, clubs can adopt the following strategies:

First, establish a salary structure that increases year by year or set up a “performance-linked” bonus mechanism, tying part of the salary to the actual contribution of the players; second, introduce a “loan plus mandatory buyout” mechanism to amortize large transfer fees over time; third, estimate in advance the commercial benefits brought by the players (such as jersey sales, sponsorship premiums) and incorporate them into the FFP compliance assessment to support budget allocation.

The case of Beckham’s transfer to Paris Saint-Germain shows that players with high brand value can feed back to financial indicators through commercial benefits and become a strategic tool to circumvent FFP (Lawrence, 2013).

4.4. Building a Bidding Strategy Model in Multi-Club Games

When multiple clubs simultaneously bid for a player without effective bid boundaries and game strategies, they are prone to fall into a “price arms race”. Memari et al. constructed a generalized Nash bargaining model and proved that setting a marginal game benefit function can significantly improve the efficiency of the buyer’s strategy (Memari et al., 2023). Based on this, it is suggested that clubs set three types of bidding behavior parameters:

First, clearly define the “maximum payment capacity threshold” and set a stop-loss point to avoid getting trapped in irrational competition. Second, establish a “bid distribution model” and adjust the bidding pace based on market heat and the player’s willingness to accept. Third, the potential strategies of other competitors are simulated, and the Nash equilibrium analysis is used to deduce the optimal bidding path.

When bidding for high-value targets, clubs can also establish an internal “bidding committee” to assess whether the potential premium is reasonable so as to balance the boundaries between competitive strengthening and financial security (van den Berg, 2011). This analytical approach naturally leads to the final dimension - monetizing intangible assets.

4.5. Enhance Negotiation Leverage by Utilizing Player Brand Value

In the contemporary transfer market, a player’s brand influence has become a key variable in contract negotiations, especially for clubs aiming to expand their global market presence. David Beckham’s transfer contract clearly demonstrated the reality of brand-driven transfers - PSG did not pay a high salary but gained far more in commercial returns through his endorsement influence and media coverage (Lawrence, 2013). Therefore, when clubs are formulating contracts, they should incorporate player brand indicators (such as social media followers, personal endorsement income, and global search popularity) into the salary model and establish a three-in-one negotiation framework of “salary + brand share + rights retention” (Majewski, 2021).

Meanwhile, the selling club can also prove the positive market externalities that the player brings to the team through brand valuation and strive for a higher transfer premium. In highly commercialized leagues such as the Premier League and Ligue 1, this type of contract structure has gradually become the norm.

5. Conclusion

5.1. Main Research Findings and Theoretical Significance

This paper takes the Beckham transfer event as a case study and, from the perspective of game theory, systematically analyzes the behavioral strategies, negotiation mechanisms, and market game processes of multiple participants in the modern football transfer market. The research finds that in the contemporary football industry, transfers are not only transactions at the competitive level but also complex game processes involving information, finance, and brand. By introducing non-cooperative games, generalized Nash models, and data-driven pricing mechanisms, this paper sorts out the structural logic of transfer pricing formation and points out the key variables that determine price and efficiency in the negotiation process.

Furthermore, the paper combines theoretical modeling with the actual institutional background to identify the strategic discontinuities and policy constraints existing in current transfer negotiations, filling the gap in existing research on the analysis of the multi-club bidding structure and brand value participation in the game. These theoretical breakthroughs translate into actionable industry solutions.

5.2. Practical Value and Realistic Implications

The five strategic suggestions proposed in this article cover the optimization directions from the transfer process system to the contract design mechanism. They not only provide specific operational paths for clubs but also offer a theoretical basis for institutional innovation of management organizations. By introducing the control of bidding rhythm, data modeling pricing, financial compliance plans, marginal bidding structures, and brand value conversion, clubs will gain stronger strategic autonomy when facing complex markets.

More importantly, players themselves can also leverage brand positioning to reshape their negotiation capabilities and achieve a significant boost in their bargaining power during salary negotiations. Thus, this article offers a set of transfer optimization ideas that can balance competition, fairness, and efficiency. Collectively, they redefine transfer success metrics beyond mere transaction completion.

5.3. Research Limitations and Future Directions

As the research mainly relies on literature and public case analysis, first-hand club data or real contract details could not be obtained. Therefore, some model parameters are still based on derived assumptions. Although the Beckham case is highly representative, the attribute of being a “star individual” may not be fully applicable to the general market environment of small and medium-sized players.

Future research could consider integrating interview data, transfer databases, and club financial disclosure information to expand the practical applicability of game theory modeling further. It could also extend the study to the women’s football transfer market, differences in emerging league systems, and the behavioral mechanisms of player agents, promoting multi-dimensional development in the study of football transfer systems.

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