Hedonic Pricing in Professional Football: Is Players' Transfer Value Explained by Sporting Performance?

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Biographical note

Daniel Martins was born on the 25th of June, 1993, in Vale de Cambra, district of Aveiro. It was in the city of Aveiro that he concluded his High School education, on Sciences and Technology, in 2010.

Daniel obtained a bachelor in Economics from the School of Economics and Management of Porto (FEP) in 2013, where he stayed to begin the Master in Management in the same year.

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Abstract

Professional football has evolved over time from a sport to a business, and that reflects in player transfers. In times of scarce resources, it is important for the clubs to invest with some restraint, looking to avoid big expenses in players that will not perform as expected. The valuation of the players' rights is, therefore, an important matter on the topic of football club management.

If every player is regarded as having a different set of skills, abilities and physical characteristics, then the correspondent sporting rights can be classified as heterogeneous products. Thus, the application of the hedonic pricing method can allow for a better understanding of how the transfer values are defined. The goal of this study is therefore to determine if these transfer values can be explained by the players' performance in their recent past.

For this purpose, transfers between clubs of each of the Big5 leagues were analysed, along with data regarding the players' sporting performance and other characteristics (such as club reputation or player's popularity), through an analysis of publicly available data. The OLS estimation of different models showed that recent performance does not explain the whole of the transfer fees, with other variables being required to explain the bigger picture.

Key-words: Hedonic pricing, professional football, asset valuation in football, intangible asset valuation, accounting in football.

Resumo

O futebol professional evoluiu ao longo do tempo de um desporto para um negócio, e isso reflete-se nas transferências de jogadores. Em tempos de recursos escassos, é importante para os clubes investir com algum controlo, tentando evitar grandes despesas em jogadores que não vão ter uma performance tão boa como o esperado. A avaliação dos direitos dos jogadores é, então, um ponto importante no que respeita à gestão de clubes de futebol.

Se se considerar que todos os jogadores possuem um certo conjunto de habilidades, capacidades e características físicas, então os direitos desportivos desses jogadores podem ser considerados produtos heterogéneos. Assim, a aplicação do método de preços hedónicos pode permitir uma melhor compreensão de como os valores das transferências são definidos. O objetivo deste estudo é, portanto, determinar se esses montantes das transferências podem ser explicados pela performance desportiva dos jogadores no seu passado recente.

Para atingir este fim, foram analisadas transferências entre clubes de cada uma das 5 maiores ligas da Europa, juntamente com dados relativos à performance desportiva dos jogadores e outras características (como reputação do clube ou popularidade do jogador), através de uma análise de informação disponível publicamente. A estimação OLS de diferentes modelos mostrou que a performance recente não explica a totalidade do montante das transferências, sendo necessárias outras variáveis para explicar toda a realidade.

Palavras-chave: Preços hedónicos, futebol profissional, avaliação de ativos no futebol, avaliação de ativos intangíveis, contabilidade no futebol.

“It is no use saying ‘We are doing our best’.

You have got to succeed in doing what is necessary.”

Winston Churchill

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1. Introduction

The fundamental idea in the Hedonic Pricing Method is that the price of a certain good is connected to its characteristics. The value of those characteristics to the consumer will be reflected on how much they are willing to pay for the good with or without those features, for instance. It is mostly used in the housing market, to value real estate regarding the characteristics of the house itself (square-footage, number of bedrooms) and the environment where it is included (neighborhood, proximity to schools or parks). The value of an extra bedroom, for example, can be observed as the difference between the prices a consumer is willing to pay for two houses in which all characteristics but the number of bedrooms are identical. Heterogeneity is thus key for Hedonic Pricing.

Football players, as individuals with different sets of skills, abilities and physical characteristics, are clearly heterogeneous. The application of this method for valuing the players' sporting rights does not seem, therefore, farfetched (in fact, it has been applied before by different authors). Although skills and abilities cannot be measured by themselves, their effective impact on the players' performance can; to a certain extent, an attacking player's performance, for example, can be measured through indicators such as number of goals, goals per game ratio or passes to goal. Other factors, like the club that owns the player's rights or the agent that represents the player, are also distinctive and may influence the market value of that athlete's sporting rights.

The primary aim of this study is, thus, to understand if a player's performance, among other factors, explains the amount exchanged between clubs for his transfer. Its relevance lies in the consequences of the results for football club management. In a context of limited resources, it is crucial that the investments in new athletes are rational and motivated by the potential to help in the clubs' sporting (and, eventually, financial) objectives. For this reason, club management could benefit from understanding which variables influence, directly or indirectly, the price paid for an athlete's rights, improving the negotiation and decision processes.

For this purpose, the transfers between top clubs of each of the Big5 leagues (from England, Spain, Germany, Italy and France) were compiled into a database. After the appropriate variables were defined, data regarding the players' sporting performance and

other variables was collected through an analysis of publicly available information. Then, the estimation of different models showed which variables explain the amount involved in a player transfer.

Besides this section, this report is structured as follows: in Section 2, a literature review of this topic is made. In Section 3, the methodology is introduced, with the definition of the model and sample. Section 4 presents the results and discussion, while Section 5 includes a brief discussion of the implications for club management. Section 6 features the conclusions of the study and recommendations for future studies.

2. Literature Review

The Hedonic Pricing Method is quite common in real estate or the automotive and wine industries, but not as much in the football business. Moreover, despite the media attention that football draws, concepts such as Third Party Ownership, economic rights of players and Financial Fair Play are sometimes not clear or wrongfully perceived.

It is therefore essential to start this analysis with some contextualization and the definitions of the concepts that will be employed later on.

2.1. Football as a business

Football clubs have evolved over time, from simple sporting associations in the 19th century to the more complex entities we see today. Now, football is considered to be a business and some of the biggest clubs are listed in stock exchanges (Capasso & Rossi, 2013) through their public limited sports companies (Sociedade Anónima Desportiva, in Portuguese).

Nevertheless, football presents itself as a rather peculiar industry, in the sense that results have to be perceived from both a sporting and a financial perspective (Szymanski & Kuypers, 1999). Over the years, the financial structure of football clubs has suffered many changes, with the main sources of funding starting to be tickets for games, later on subsidies and more recently investments by privately owned companies. Publicity and sponsoring contracts grew in importance, along with television broadcasting rights (Andreff, 2006). The broadcasting rights disrupted the existing paradigm, increasing the difference between small and big clubs. Consequently, some small clubs, who saw their purchase power for new athletes' rights reduced, decided to invest in training young players, rather than acquiring new stars (Lombardi et al., 2014).

Following the changes in football club management, the trend was set to be a reduction of relative management costs. One of the answers for this problem presented itself as the division of a player's economic rights, with the owner club sharing these rights with another party, such as a company or an investment fund.

2.1.1. The distinction between economic and federative rights

A crucial distinction must be made at this point: that between economic rights and federative rights of a football player. The federative rights of an athlete are the rights that bind that athlete to the club he represents, through the employment contract established between the two parts. These rights, also called rights of pass, are what allow the players to represent the club in competitions, and must therefore be registered with the correspondent football federation. Given the mentioned features, only clubs can hold these rights, and the economic value associated to them corresponds to the "economic rights derived from the federative rights" (KPMG, 2013 and Cruz et al., 2011).

The economic rights are therefore any financial rights that arise from the transfer of federative rights between two clubs, and the holders of these rights are also the clubs. However, unlike federative rights, these can be shared with a third party. This process requires a commercial relationship between the two parts, and it assigns the third party a future credit in case the player at stake is transferred (KPMG, 2013). This is the basic principle of a Third Party Ownership agreement.

2.1.2. Third Party Ownership: roots and concepts

Third Party Ownership's origins lie in South America, being later on brought to European countries. The main allure was the fact it allowed clubs to acquire young stars while diversifying risk and reducing investment (versus a scenario without TPO), and with the third party assuming a position of potential capital gain with a future transfer of the player (Lombardi et al., 2014).

TPO agreements can fit one of two different types: financing TPO and investment TPO (KPMG, 2013). The first corresponds to the situation where a club sells part of the economic rights of a specific player, thus receiving a certain amount. The second happens when a club acquires a player and, at the same time, part of the economic rights of that player are purchased by a third party.

For clubs, TPO presents itself as an alternative source of financing. Following the recent financial crisis, the availability of bank loans shrank, which forced clubs to look for other options (Andreff, 2011). Moreover, it allows clubs to make moves onto players that they would not be able to afford otherwise, and can be a solution to solve short term liquidity problems, through the aforementioned financing type of TPO.

For the investors, the appeal of TPO is the possibility of obtaining significant profits, in theory unlimited, with a reduced level of risk. Most of the times the contracts feature clauses with minimum return or interest, thus the risk laying in the more or less small chance of the club entering a situation of insolvency (KPMG, 2013).

2.2. Transfer markets and regulation

Simmons (1997) states that transfer markets are operated in the majority of football leagues under the authority of FIFA (*Fédération Internationale de Football Association*) and, in Europe, of UEFA (Union of European Football Associations). They represent the only path that allows football clubs to be financially rewarded for their investment in the development of young players (Borges, 2011). Nevertheless, the rules and procedures associated to the movement of players between clubs have changed over time, with the Bosman ruling in the 1990s being a particularly disruptive factor.

2.2.1. Transfer markets through time

The first evidence of the transfer system lies in the English Football Association's regulations in 1885, which demanded every player in the national leagues to be annually registered with that association (Constantino, 2006). The registered players were bounded to their clubs for as long as the clubs desired – if a player refused to renovate his contract at the end of the season, he could not play for another club unless the former club allowed it (Simmons, 1997). This restriction made it possible for a club to require a compensation fee from the new club in order to free that player.

This retain and transfer system in England was not challenged until the 1960s, and was finally abolished in 1978, giving place to a system of freedom of contract. A player was free to move to another club after his contract expired, but the previous club was still entitled to a compensation, determined by agreement between clubs or, if necessary, by an independent court. A higher mobility for players increased their bargaining power, especially for the most desired players. This led to a significant rise in player wages, which for decades had been limited (Gerrard, 2001).

Under the new system, a player could be transferred for free (with no fee involved) if the club failed to make a contract offer that was similar or superior to the conditions provided before. In case a fair offer was made and rejected by the player, the club could still require a compensation fee (Simmons, 1997).

Still according to Simmons (1997), before the 1995/1996 season most leagues had their transfer markets operating on two simple principles: first, a fee would have to be paid when a player wanted to change clubs, even if the player's contract had ended; and second, the leagues enforced a strict control on the number of foreign players a team could play in a given match. The Bosman case motivated discussion regarding freedom of movement and led to a harmonization of rules and procedures in the different leagues.

2.2.2. The Bosman ruling

In 1990, Jean-Marc Bosman saw his contract with Belgian club R.C. Liegois expire. The club offered him a new contract, worth less the previous one, which the player rejected (Simmons, 1997). Bosman decided to sign a contract with the French club U.S. Dunkerque, with the new club being obliged to pay a fee to the Belgian club (Constantino, 2006). For Bosman to be able to play for his new club, the Belgian Federation would have to send his registration certificate to the French Federation, on request of Liegois. However, Liegois did not proceed with the request, due to their doubts on the French club's solvency (Antonioni & Cubbin, 2000). As a result, Bosman could not take part in any game in the following season. Bosman took the matters to court, where he fought until 1995, claiming that the requirement of a fee limited his

freedom of mobility in the European Union, according to the Treaty of Rome (Constantino, 2006).

In December 1995, the European Court of Justice ruled in favor of Bosman. The court decided the rule stating players without a contract could only move between clubs of different European Union countries if a transfer fee was agreed between clubs was incompatible with the principle of freedom of labor established by the Treaty of Rome. Moreover, the same principle did not allow for a limitation of the number of foreign players in a club (Simmons, 1997).

This ruling led to a single, European labor market for football players and extended their contractual freedom. According to Gerrard (2001), a major consequence of the outcome of the Bosman case and the free agency associated to it was that a player's transfer value became dependent on the remaining duration of his present contract.

2.2.3. Financial fair play and TPO regulation

The regulation in European football has been a standard practice ever since UEFA was created. However, recent developments regarding financial performance of the clubs have forced that organism to intervene with somewhat strict financial regulations. The idea of regulating club finances is not new, as a limit for maximum costs had already been discussed in the beginning of the past decade (Preuss et al., 2014).

More recently, UEFA has introduced the Financial Fair Play (FFP) rules, which aim to soften the differences between clubs and provide equality of opportunities, while forcing the clubs to pursue more sustainable financial management practices. The basic principle clubs have to obey is the so-called "break even requirement" that forces clubs to limit its expenses to the approximate value of its income in the last seasons (Lombardi et al., 2014). The failure to comply with such criteria may result in the club facing sanctions, such as fines, transfer bans or exclusion from European competitions (Petit, 2014).

The use of a mechanism such as Third Party Ownership, that can impact the balance sheet through asset valuation, for example, has led UEFA to act on occasion. The lack of

transparency existing in these moves has an impact that goes further than the sporting ethics, affecting the fulfilment of UEFA's requirements regarding Financial Fair Play. The regulation has thus been reformulated and strengthened, but the limitations imposed by the European Union's freedom of circulation of people and capital did not allow UEFA to go much further (Lombardi et al., 2014). However, and with UEFA's support, FIFA acted on the topic of TPO by establishing that "no club shall enter into a contract which enables any other party to that contract or any third party to acquire the ability to influence in employment and transfer-related matters its independence, its policies or the performance of its teams" (FIFA, 2014). The general interpretation was that FIFA had prohibited *third party influence*, thus leaving space for ambiguity (Amado & Lorenz, 2015). To end such issue, FIFA reviewed the rules to include a new article, stating that "no club or player shall enter into agreement with a third party whereby a third party is being entitled to participate, either in full or in part, in compensation payable in relation to the future transfer of a player from one club to another, or is being assigned any rights in relation to a future transfer or transfer compensation" (FIFA, 2015). Starting on the beginning of May, 2015 the TPO was prohibited, with the previously signed contracts being allowed to continue in place until their expiration date, without the possibility to extend it. Moreover, clubs were obliged to inform FIFA of all the existing TPO contracts and upload them to an online platform (FIFA, 2015)

2.3. Footballers as intangible assets

According to the International Accounting Standards Board (IAS 38), an asset is "a resource that is controlled by the entity as a result of past events and from which future economic benefits are expected". The three critical attributes of an asset are, therefore, identifiability, control and future economic benefits.

Constantino (2006) states that in a football team, a player is a separable and distinct element, one that can be replaced, sold and provide future economic benefits. The club does not own the player himself, but rather the federative rights, which as stated before are born with the employment contract between the two parts (Borges, 2011).

To consider a certain element as an asset, the company must be able to control the future economic benefits that it can origin, as well as to stop others to collect those same benefits. Since the terms of the sports contracts and the rules imposed by FIFA and UEFA prevent the players from leaving the clubs without compensation or against the clubs' will, then the clubs hold control over the federative rights of the footballers and the economic benefits that can from these arise (Constantino, 2006). Control must be a consequence of a past event, such as a transaction or even self-creation. In football, the first would be a transfer among clubs, while the second would correspond to the players developed within the club. The defining moment will be the signing of the contract between club and player, as it is from that point in time that the club holds the economic rights of the player, corresponding to the future economic benefits (Constantino, 2006).

Since all three defining conditions to consider a certain element as an asset are met, then it is established that the federative rights of a football player are in fact an asset for the club. However, it is still necessary to evaluate if it is an intangible asset.

An intangible asset is "an identifiable non-monetary asset without physical substance", according to IAS 38. The federative rights are incorporeal and acquired with the purpose of generating benefits for the club (Constantino, 2006). These benefits are not only economic, but also sporting – the contribution of the players for the club performance success is intangible (Michie & Verma, 1999).

The federative rights of a football player, representing his skills and abilities, can thus be classified as an intangible asset, and therefore be included in the balance sheet of the owner club.

However, traditionally, any valuation of football players was excluded from the club's balance sheet, regardless of those athletes being transferred in or developed in-house (Morrow, 1996). The transfers were regarded as costs or revenues in the corresponding period (Rowbottom, 2002). Over the last two decades, this situation has changed, as clubs realized that such policy did not represent a fair view of the financial situation.

The most popular methods for player valuation in the balance sheet are historical cost and in-house determined value (Rowbottom, 2002). With the first comes an amortization of

the paid amount over the length of the contract until a certain residual value is reached. This method does not allow clubs to attribute value to internally developed players, or players that were not purchased (Rowbottom, 2002), as happens when they are recruited after contract with the previous club expires (Constantino, 2006). Rowbottom (2002) presents the second approach as determined through the assessment made by the managers or club directors, who determine the player's value, corrected by reevaluations and transfers. This alternative no longer poses a barrier to the valuation of youth players generated in-house.

2.4. Hedonic Price Method

Hedonic pricing is usually applied to differentiated goods, such as real estate, cars or wine. In 1966 Lancaster adapted the neoclassical model, considering not the goods themselves, but the characteristics or properties of those goods instead. Each of those goods may have a large amount of properties or characteristics, with the definition of the relevant ones being dependent on consumer behavior, determined by experience (Cohen, 2009).

According to Cohen (2009), there are three assumptions for a good to be suitable for the application of hedonic pricing:

1. The good has characteristics that are both objective and measurable, meaning that even though not every consumer agrees on the appeal of such characteristics, they agree on their existence;
2. The characteristics are valued differently by different consumers – for instance, when buying a house, a young couple might value proximity to city centre more than a view, while a retired couple might feel the opposite way;
3. There is a linear and addictive nature to the relationship between good and characteristics, and therefore by doubling the quantity of the good the quantity of the characteristics doubles as well.

The hedonic regression produces coefficients (implicit, or hedonic prices) that are "interpreted as the effect on the market price of increasing a particular product attribute while holding the other attributes fixed" (Bajari et al, 2010).

As stated by Borges (2011), the value of an asset is given by the sum of the value of each of its characteristics; thus, if both characteristics and individual values can be identified, the value of the asset can be estimated. In the case of football players, distinctive characteristics will lie on their particular abilities and skills, measured by performance. Applying this method will identify which observable characteristics provide market-efficient predictors of the footballers' performance in the future (Gerrard, 2001).

This method has several advantages over other approaches. The traditional supply and demand model for establishing the price (in this case the transfer fee) would fail to capture the bigger part of the reality, as top players represent only a very small percentage of the total amount of professional footballers. Moreover, the lack of homogeneity and perfect information make it unfeasible to assess the value of an intangible asset through this approach (Borges, 2011). The hedonic price method suppresses the need for homogeneity, as its root is heterogeneity itself.

Another alternative would be the historical price method, meaning players would be valued either by the sum of the costs the clubs incurred in for an athlete to achieve his current status or by the cost of substituting him for obtaining a similar one (Borges, 2011); however, once again, this would not take into consideration that each player has a different set of features that ultimately makes him unique.

2.5. Similar studies

With the growing popularity of the football business over the last decades came the scientific interest regarding the dynamics between clubs, from an economic and managerial point of view. Rowbottom (1998) developed a model for measuring player value at their replacement cost through an Ordinary Least Squares regression analysis with historical data. The author states that footballers with greater ability have the potential to generate more revenue for the club that he represents, and that makes them

more costly to substitute. As determinant characteristics, Rowbottom uses current footballing ability (including skill level, physical and mental fitness, along with performance standard) and expected footballing ability (based on age and potential skill level). The sample corresponded to the whole of the transfers from English clubs in the 1994/1995 season, excluding free transfers, to a total of 253 cases. The goal of predicting value of player registrations for accounting purposes was achieved, as the model was successfully tested with selected transfers from the next season, presenting a high correlation coefficient.

Gerrard (2001) built a composite player quality index that when aggregated for the different players of a club would present a team quality index. That indicator was based on observable characteristics such as age, experience and previous performance, thus representing an *ex ante* measure of a footballer's quality. Through the application of the hedonic prices technique, those predictors of future performance would correspond to the systematic determinants of current player value. The sample comprised all the 539 players in the English top league in the 1998/1999 season, but the goal was to assess the relations between wages, quality per club and league performance, rather than transfer values. Gerrard and Dobson (2000) had already studied 1350 transfers in England from 1990 to 1996, developing a formal model of the determination of the fees involved in player transfers. The presence of monopoly rents was empirically tested, after it was argued that the selling club could get "a share of any positive differential between the value of the player to the buying club (reflected in the maximum bid-price) and the selling club's reservation price".

Barrio and Puyol (2004) studied monopsony rents in the Spanish league in the 2001/2002 season, with the particularity of the inclusion of a player popularity variable measured by the amount of references in a Google search. The results allow the authors to conclude that there are two segments in the labour market supply, where the most renowned players are overly paid (due to their greater bargaining power) at the expense of part of the monopsony rents captured by the clubs from regular players.

Later on, Barrio and Puyol (2008) developed estimates of "fair transfer fees" for professional footballers, taking into consideration that media value (based on the players' popularity) is the key intangible asset for players and clubs to generate revenue. The

sporting performance of the players is not taken into account, as the authors state that it is already included in the media value. These estimates are then compared to 84 actual transfers, with the model achieving an adjusted R square of 0.73.

Borges (2011) conducts the study in which goals and methods are apparently closer to the ones intended with this dissertation. The sample includes 450 transfers among 15 different leagues, between January 2005 and January 2011. The innovation introduced by Borges lies in the use of a football videogame with a large database to assess player characteristics, as an addition to the more frequent variables such as goals and games played; moreover, the countries' GDP (through purchase power parity) is also included as a variable . The model draws from Gerrard (2001) and from Barrio and Pujol (2004), including a variable based on popularity through Google search results. Borges reached an adjusted R square of 0.76, and the results show that forwards are on average slightly more valuable than defenders and midfielders.

3. Methodological Aspects

The objective of this chapter is to present the valuation method that this study intends to test, based on the existing literature on Hedonic Pricing and footballers' valuation. The theory around the Hedonic Price Model was introduced before, but the model for this study will be specified in this section. The methodological aspects, such as the as the choice of databases and sample, are also featured in this section.

3.1. Methodological aspects of similar studies

The similar studies aforementioned had the similarity of relying on OLS estimations to reach their results. However, the sample sizes varied a lot, given the different countries in study, as well as the periods of analysis considered for compilation of transfers.

Table 1 summarizes the main characteristics of the reviewed studies.

Authors	**Country of study**	**Sample size**	**Period under analysis**	**Statistical Analysis**
Rowbottom (1998)	UK	253	1 year	OLS regression
Gerrard & Dobson (2000)	UK	1350	6 years	
Gerrard (2001)	UK	539	1 year	
Barrio & Pujol (2008)	Spain	84	1 year	
Borges (2011)	15 in Europe	450	6 years	

Table 1: Summary of the characteristics of studies reviewed

3.2. Sample

The sample includes transfers between clubs from the top leagues of England (Barclay's Premier League), Spain (La Liga BBVA), Germany (Bundesliga), Italy (Serie A) and France (Ligue 1), also known as the Big5 leagues, in three seasons: 2011/2012, 2012/2013 and 2013/2014.

In total, 383 transfers were analysed. 55 of these happened in the winter market (the "January transfer window") and the remaining 328 in the summer market. The sample comprises 250 transfers within the same league, and 133 international transfers.

Nearly 93% of the transfers included a fee equal to or above €1M (a total of 356), 54% equal or above €5M (a total of 208) and over 28% equal or above €10M (a total of 109). As expected, the 383 are distributed evenly throughout the three seasons: 136 in 2011/2012, 114 in 2012/2013 and 133 in 2013/2014.

The transfers chosen for the study were the ones that verified the following criteria:

- Transfer happened between clubs featured in the Big5 leagues in the same season;
- Transfer involved a disclosed fee (excludes simple loans and free transfers, as well as transfers in which the amount involved is unknown);
- Transfer occured in the 2011/2012, 2012/2013 or 2013/2014 seasons;
- Transferred athlete played for either the selling club or the buying club (if he was on loan) during the season prior to the transfer, or in the first half of the season in the case of winter transfers;
- Transferred player played at least 900 minutes (corresponding to the duration of 10 games) in the domestic league in the previous season, or 450 minutes (5 games), in the season they were transferred, in case it happened in the January window;
- Player is an outfield player (goalkeepers are not considered in the study);
- There is all the necessary, detailed performance data for the transferred player in the corresponding season.

The data was obtained from different websites. The transfer fees, clubs and seasons could be found in TransferMarkt (http://www.transfermarkt.com), an originally German website that provides information regarding player transfers, market value and historical performance. The individual statistics, player personal data and performance index were drawn from WhoScored (http://www.whoscored.com), a website that provides detailed statistics (from Opta, a sports data company that works with companies such as Sky Sports, ESPN or BBC Sport), creates and compiles analysis on the major football competitions. The figures for player participation in International games for their National Teams were obtained from http://www.national-football-teams.com. The popularity of the players involved Google (http://www.google.com), as will be described later on.

Although not all of the used data is official, it is nonetheless a close approximation and one that fits the purposes of this study.

3.3. Model

The model used in this study draws from Gerrard (2001), according to whom the hedonic pricing technique allows for the identification of the observable player features that can be regarded as providing good forecasts of future performance. The author proposes that the value of a player (i) at a certain time (t) depends on his expected future performance (q^e):

$$V_{i,t} = f_v(q^e_{i,t}) \tag{3.1}$$

Moreover, the expected future performance can be predicted by player features (X_1,…, X_m) observed in the recent past ($t-1$):

$$q^e_{i,t} = f_e(X_{i,1,t-1}, \dots, X_{i,m,t-1}) \tag{3.2}$$

By substituting equation (3.2) into equation (3.1) and assuming a linear stochastic relationship, the result is:

$$V_{i,t} = a_0 + a_1 X_{i,1,t-1} + \cdots + a_m X_{i,m,t-1} + u_{i,t} \tag{3.3}$$

Equation 3.3 represents, then, the hedonic-pricing relationship for the value of a player. In this context, the coefficients $a_1, \dots, a_m$ correspond to the hedonic prices for the

observed player characteristics, while a_0 is the component of the player's value that is independent of his features. Gerrard (2001) states that this component captures the effect of wages or transfer fee inflation, for example. For the purpose of the OLS regression, it is assumed that the term $u_{i,t}$ has constant error, is independent and fitting the normal distribution, with the mean of zero.

3.4. Variables

The variables included in the study are not significantly different from previous studies on this matter. The main intended differentiation factor is the combination of variables from different studies, along with the introduction of a new one – the performance index.

This index goes further than the traditional statistics (goals, assists) as it includes all the impact of a player in the game, from passing success to the percentage of headers won.

The set of variables used in this study can be separated in two groups, depending on them being related to the players or the clubs.

3.4.1. Player-related variables

The dependent variable is, naturally, the transfer fee (FEE) - this is the variable that the study aims at explaining with the following explanatory variables.

Two characteristics of the players that do not depend on their performance are age and height. The importance of the first has its foundation in the fact that a football player's professional career usually lasts approximately between their 18 and 34 years of age, with the market value of the player being significantly different in diverse phases of his career. While the players are young and still developing their skills, their value will be lower than when they reach the peak of their abilities; from that point on, the value will decrease again, as the players lose some physical capability. The average age at which the players reach their peak varies according to the sources, ranging from 24 to 27. The height variable is straightforward, and is presented in centimetres (HEIGHT). Two dummies, RIGHT and LEFT will take the value 1 if the player's stronger foot is the right or the left one, respectively; if both dummies take the value 0, then the player is equally good with both feet. The relevance of including these variables lies in the reduced number of left

footed players when compared to right footed players; moreover, a player that is equally good with both feet may be more valuable than a player that can only rely on one of his feet to be successful in a game.

The number of minutes played in the domestic league in a certain season (MINUTES) allows for understanding of both the player's endurance and his importance for the team. The limits imposed in the sample (900 minutes for a full season or 450 for half a season) guarantee that the player took part in a minimum number of games before being transferred, and that his performance may have influenced the transfer fee. It is a better variable than the number of games, as a footballer may play 1 minute or 90 minutes in a certain game, a dimension not captured here but one that MINUTES does take into account. To complete the assessment of the player's importance, the ratio between the number of times he was part of the starting XI (the eleven players that start the game) and the total of games in which he participated can be defined (FIRSTXI).

The number of goals scored (GOALS) is one of the most important aspects when it comes to the performance of an attacking player. Moreover, the relative weight of his goals in the total of goals scored by the team (GOALRATIO) is a proxy of how important he is for the team's success. Similarly to goals, passes to goal, also known as assists (ASSISTS) are an indicator of the player's performance. The number of yellow and red cards (YELLOW and RED) awarded to a player will negatively impact their performance, unlike the amount of shots per game (SHOTSPG) or the success rate of their passes (PASSING). The number of aerial duels won (AERIALS) consist in the fights for the ball in which the player beat his opponent with a header. When a player's performance is regarded as the best among all the players in a specific game, he is awarded a Man of the Match award (MOTM). The performance of a player in a game can however be summed up in one single value, the OPTA index provided by WhoScored; RATING will then present the average rating of a player on all the league matches in which he participated in a given season. This value takes into account every action taken by a player in the field, be it defensive or offensive, and it is one of the key differentiation points of this study when compared to previous ones. RATING can be expected to have a high correlation with the other performance variables indicated above, as it comprises all of them into a single number. The estimation will tell which of the two (index or set of statistics) has a better explanatory value.

The second dummy (UCL) takes the value 1 if the player participated in any UEFA Champions League game in the previous season (or present season for players transferred in the winter). The UEFA Champions League is widely considered as the most important club competition, and therefore one where the players' participation and performance can be particularly important for their value and distinguishability. UCLGAMES will present the number of games in which a player participated for his team in the UEFA Champions League, and UCLRATING the aggregated performance rating supplied by WhoScored for this competition.

There is another important dimension in football besides league games and the Champions League, the international games. A player's value will be higher if he represents his National Team, as those are believed to be the best players of each country. Therefore, GAMESNT will show the number of games for the national team a certain player took part in (in the civil year in which the season began, for example 2013 when the transfer happened in 2013/2014, and 2012 when the transfer occurred in 2012/2013). The goals for the National Team (GOALSNT) also boost a player's popularity, and are therefore an important variable. WhoScored only provides data for National Teams' games when they are part of a major competition (World Cup, European Cup), thus excluding qualification games and friendlies; for this reason, only goals were considered for the performance in this case.

Four dummies define the player's position: FORWARD takes the value 1 if the player is a winger or striker, ATTMID takes the value 1 if the player is an attacking midfielder, DEFMID takes the value 1 if the player is a central or defensive midfielder, and FULLBACK, that takes the value 1 if the player is a fullback. If all of those take the value 0, then the player is a centre-back.

The player's popularity can be a proxy of his transfer value, as concluded by Barrio and Pujol (2004). As stated before, the authors used the number of hyperlinks returned when searching for a player's name on Google as an indicator of his popularity. This study will use the same procedure to assess the player's popularity, under the variable GOOGLE.

The players' representatives, or agents, play a crucial part in the transfer negotiations, smoothing the talks between clubs and reclaiming the best conditions (club and salary) for their players. Ceteris paribus, it is expected that a more successful agent (such as Jorge

Mendes) will manage to place a player in a more important club than a less experienced agent. Another important aspect when it comes to a transfer is whether there is or not a third party involved. Although TPO is not allowed in England, it can be used by a Spanish club to acquire a player from the Premier League, for example. However, both of these dimensions were omitted from the study, as historical data was unobtainable.

Ideally, the remaining duration of the player's contract before the transfer should also be taken into consideration; nevertheless, and similarly to information on agents and TPO, it was impossible to access such data with the available resources.

Table 2 summarizes the player-related variables and their descriptions.

3.4.2. Club-related variables

The main factors related to the clubs that can affect the transfer value are their reputation and classification in the past season, besides the reputation of the league they are featured in. Therefore, the variables SELLCLUBREP and BUYCLUBREP will represent the seller club's and buyer club's reputation, respectively. The reputation will be measured by the club's position in the UEFA Club Ranking for the five years before the transfer occurred. A small number will therefore represent a higher reputation, and vice-versa. If the club is not featured in the ranking (in case it has not played in the UEFA Champions League or Europa League in the last 5 years), a value of 200 will be attributed, considering the gross majority of clubs featured after this position in the UEFA ranking are less known clubs from leagues with a worse reputation than the Big5 leagues.

The reputation of the leagues of the seller club and buyer club (SELLLEAGUEREP and BUYLEAGUEREP) can be measured by the league's position in the UEFA country rankings. Expectedly, the ranking will represent the competitiveness and prestige of the league, which will affect the perception of the player's value and performance.

The CLASSIFICATION will represent the club's position in the national league in the previous year (1 if the club was the champion, for example). It is expected that a player that was crowned champion in the past season sees his value increase, therefore making the club classification an apparently relevant variable. If the club was promoted to the top league this season, the classification will be calculated by adding its classification in the

secondary league to the number of clubs in the top league (for example, when the champion of the second league is promoted to a 20-club top league, its classification in the previous season will be 21). Besides these, the dummy INTERNATIONAL will take the value 1 if the transfer was negotiated between clubs of different leagues, and 0 if negotiated between clubs of the same league, to check for significant differences in fees of national versus international transfers.

There are more aspects of the transfer that could be included in either the player or club related variables, but were included in this section. The dummy WINTER takes the value 1 when the transfer happened in the January transfer window, and 0 when the transfer occurred in the summer, thus allowing for the study of the potential impact of the transfer date in the fee.

It is a growing practice for clubs to acquire players on loans, be those short or long term; it is also common for those clubs to purchase the sporting rights for the loaned player if the player's stay at the club is successful. For that reason, the dummy LOANED was included to capture a possible effect on transfer fee of the loan of a player at the buying club.

A summary of these club-related variables is featured in Table 3.

Category	Variable	Description
Physiognomy	AGE	Player's age at the date of the transfer, in years
	HEIGHT	Player's height in centimetres
	RIGHT	Dummy: 1 if the player's stronger foot is the right one
	LEFT	Dummy: 1 if the player's stronger foot is the left one
Performance	MINUTES	Number of minutes played in the past season *
	FIRSTXI	Ratio between games as a starter and total of games in the past season *
	GOALS	Number of goals scored in the past season *
	GOALRATIO	Ratio between goals scored by the player and the team in the past season *
	ASSISTS	Number of assists in the past season *
	YELLOW	Number of yellow cards awarded to the player in the past season *
	RED	Number of red cards awarded to the player in the past season *
	SHOTSPG	Average number of shots per game in the past season *
	PASSING	Average passing success rate in the past season *
	AERIALS	Average number of aerial duels won in the past season *
	MOTM	Number of Man of the Match awards in the past season *
	RATING	Average performance rating in the past season *
	UCL	Dummy: 1 if the player played in the UEFA Champions League in the past season *
	UCLGAMES	Number of games played in the UEFA Champions League in the past season *
	UCLRATING	Average performance rating in the UEFA Champions League in the past season *
	GAMESNT	Number of games played for the National Team in the last civil year
	GOALSNT	Number of goals scored for the National Team in the last civil year
Position	FORWARD	Dummy: 1 if the player is a forward
	ATTMID	Dummy: 1 if the player is an attacking midfielder
	DEFMID	Dummy: 1 if the player is a central or defensive midfielder
	FULLBACK	Dummy: 1 if the player is a full back
Other	GOOGLE	Number of hyperlinks associated to the player's name and year previous to the transfer in Google

*in the season of the transfer, if the transfer occurred in the January window

Table 2: Summary of the player-related variables and their descriptions.

Category	Variable	Description
Reputation	SELLCLUBREP	Selling club's position in the UEFA ranking
	BUYCLUBREP	Buying club's position in the UEFA ranking
	SELLLEAGUEREP	Selling club's league position in the UEFA ranking
	BUYLEAGUEREP	Buying club's league position in the UEFA ranking
Performance	CLASSIFICATION	Selling club classification in the past season
Other	INTERNATIONAL	Dummy: 1 if the transfer happened between clubs of different countries
	WINTER	Dummy: 1 if the transfer occurred in the winter window
	LOANED	Dummy: 1 if the player was on loan to the buyer club immediately before the transfer

Table 3: Summary of the club-related variables and their descriptions.

4. Results and Discussion

The theoretical model and set of variables chosen led to the creation of two different set of models, each of those with 3 variations. The first, set A, includes both the player and club related variables; on the other hand, set B includes only player-related variables, as that was the main target of the study. For each set, three models will be presented: A1 and B1 comprise all the variables, A2 and B2 maximize adjusted-r^2 (by trial and error), while A3 and B3 include statistically significant variables only.

The expected behavior of all the variables can be found in Table 4, below:

Variable	**Signal**	**Variable**	Signal
AGE	-	UCLGAMES	+
HEIGHT	+	UCLRATING	+
RIGHT	-	GAMESNT	+
LEFT	+	GOALSNT	+
MINUTES	+	FORWARD	+
FIRSTXI	+	ATTMID	+
GOALS	+	DEFMID	-
GOALRATIO	+	FULLBACK	-
ASSISTS	+	GOOGLE	+
YELLOW	-	SELLCLUBREP	+
RED	-	BUYCLUBREP	+
SHOTSPG	+	SELLLEAGUEREP	+
PASSING	+	BUYLEAGUEREP	+
AERIALS	+	CLASSIFICATION	+
MOTM	+	INTERNATIONAL	+
RATING	+	WINTER	+
UCL	+	LOANED	-

Table 4: Expected relation between variables and transfer fee.

A summary of the results of the different models is presented in the Table 5:

	Set A			Set B		
	A1	A2	A3	B1	B2	B3
N	383	383	383	383	383	383
R^2	62.5%	62.2%	56.7%	59.5%	58.9%	56%
Adjusted R^2	59.0%	60.0%	55.3%	56.6%	57.2%	54.9%
S.E. of regression	6.69	6.61	6.99	6.88	6.84	7.02
Akaike info criterion	6.72	6.67	6.76	6.76	6.72	6.76
Schwarz criterion	7.07	6.9	6.89	7.03	6.89	6.86
Durbin-Watson stat	1.99	1.97	2.04	1.98	1.97	1.97
Variables	34	22	13	26	16	10

Table 5: Summary of the results of the different models.

This summary clearly shows that the initial amount of variables was too high, with several of them appearing to be of little (or none) consequence in the explanatory value of the models. The intent of moving from models A1 to A2 (and similarly from B1 to B2) was to maximize the value of the adjusted r^2, as this index measures how close the estimated and observed values while taking into consideration the number of variables involved – r^2 by itself does not capture this dimension. From A1 to A2, 12 variables were removed and the adjusted r^2 increased by 1%, meaning that the inclusion of those 12 variables was in fact harmful to the explanatory value of the initial model; likewise, by removing 10 variables from B1 to B2, the adjusted r^2 rose by 0.6%. In both cases the value of the r^2 diminished slightly. Both sets present lower adjusted r^2 values when only statistically significant variables are considered – at this point we can conclude that a big number of initially chosen variables are of no statistical consequence to the explanation of the players' transfer fees.

Comparing the results of Set A (Club and player related variables) with those of Set B (player variables only), it is clear that the model benefits from these additional variables. However, that increase is small: 2.8% is the maximum difference, reached when both A

and B see their adjusted r^2 values peak. If we take into consideration the models with significant variables only, that difference shrinks to 0.4%.

Overall, the obtained results are those presented by other studies on the topic. This study differed from previous others by including international transfers, albeit limited to the Big5 leagues, and presenting the performance rating as a key variable. This index is probably the biggest recent breakthrough regarding publicly available statistical data for football, and one that should be taken into consideration for future studies. The suggestions for future research, along with the discussion of the low explanatory value of the models, will be further detailed in Section 6 of this study.

Looking at the models individually, some variables were immediately spotted as being of no statistical significance. In this group fall AERIALS, RED and YELLOW. CLASSIFICATION and FIRSTXI are also featured here, although coming as more of a surprise than the first ones. The club classification was expected to have some impact in the players' rights value, similarly to a player's ratio of games as a starter (as it arguably shows how important a player is to the team) – this can however be countered by the variable MINS, that is significant at 95% in every model, and positively influences value.

The WINTER variable was not significant, contrary to expectations. In theory, a January transfer would be slightly more expensive than a summer transfer, as clubs are less open to changing their squads during the season. A player's stronger foot, presented by LEFT and RIGHT, is inconsequent as well.

Nonetheless, the variables which lack of significance raises more questions are the position dummies. FULLBACK is the only position significant in every model, with a negative coefficient indicating that players in this position are less expensive than the remaining, but allowing for no conclusion as for the relation between those other positions.

Like FULLBACK, other variables were statistically significant at 95% or even 99% confidence across all models. AGE has a negative coefficient around -0.80 for both A3 and B3, showing that transfer value reduces as a player ages. This result was expected,

since players with high potential and peaking players are usually more expensive than those in a more advanced career stage. GAMESNT positively influences value, as players increase their visibility and prestige when representing their countries. A very odd result rose in GOALRATIO, showing a negative influence of the player's percentage of goals in the total of team goals (coefficients of -82 in A3 and -80 in B3). The explanation for this is unclear, as a club would expectably be more reluctant to sell a player that has a big part in their success, thus negotiating at higher values.

As expected, GOALS and RATING have a strong, positive impact on the transfer fees, with both being significant at the 99% confidence level in all models.

The player's popularity, measured by GOOGLE, is significant with 95% confidence in B3, but fails to be so in Set A. This is, in fact, along with PASSING, one of the only 2 variables that are significant in B3 (player related only) and not significant when club variables are introduced in A3.

On the other hand, from A3 we can infer that the club-related variables that are of statistical significance to the study (with 99% confidence) are SELLCLUBREP, SELLLEAGUEREP and LOANED. All of these have a negative coefficient; this is straightforward for LOANED, as a loan usually involve the payment of a fee upfront (usually undisclosed), with the exercise of the buy-option corresponding to the effective transfer fee considered in the study. As for the reputation of selling clubs and leagues, a positive impact was initially expected: better reputation could lead to higher bargaining power when selling a player. Nonetheless, the most known and powerful clubs do not usually rely on transfer income to support a big part of their budgets; moreover, these tend to pay higher wages than smaller clubs. Both conditions combined can lead these clubs to require a smaller fee to liberate a player, thus explaining the negative relation between selling club reputation and transfer fee.

5. Consequences for Club Management

Nowadays many football clubs face challenges when it comes to obtaining financing, with some solutions ranging from bank loans to TPO agreements, for instance. This difficulty forces clubs to be more careful in the way they allocate money in their budgets; transfers are a big part of some clubs' budgeting process – yearly targets for the sale of player rights is not uncommon, and investment caps are a reality especially for small and medium-sized clubs. In Portugal, for example, it has become common practice for the top clubs (medium size clubs at the European scale) to issue bonds/obtain loans with the future sale of a player as collateral.

A club that aims to strive in the present and near future must be able to properly quantify how much it should invest or receive when acquiring/selling a player's rights. This is where models such as the one presented in this study enter, as they offer insight into what clubs are actually paying for. The explanatory value of the model featuring only player-related variables shows that recent performance is not the sole factor regarding how transfer fees are reached. There is a wide array of features that influence those fees; some are presented here, but many others were left out. One of those is the fact we cannot assume clubs are managed aiming at profits; they mostly sporting results, sometimes at the expense of financial steadiness. This will be one of the biggest limitations to the use of the conclusions of this study, or the developments applied to it by future research. The lack of financial rationality by clubs when dealing with transfers can impact both the results of studies such as this (as a fee may not be fully explained by any known variable) and their use for progress towards that very rationality.

One can hardly argue, nevertheless, against the usefulness of a model such as the ones here built. The inclusion of more variables, especially those of difficult access to the general public, can improve the predictive quality of the overall model.

The widespread use of these models could benefit the majority of football clubs in their decisions to buy or sell, since good decisions are those made with as much information as possible. In contexts that are not foreign in the football world, such conflict of interest and general lack of transparency, having light shed on what makes a player more expensive than others through real data can help both small and big clubs.

6. Conclusions and future research

The football business has changed significantly over the last decades. From the Bosman ruling to the involvement of investment funds, the paradigm of transfers in football has shifted, with the Federations' regulations and clubs' practices evolving in order to keep up with the new reality.

Although the dynamics of transfers in professional football have been previously analyzed, it is important to study broader samples and to update them with newer, always-growing information.

This study aimed at establishing a connection between players' sporting performance and their transfer value, for player moves in and between the top five European football leagues. For this purpose, 383 transfers, over a period of three football seasons, and the corresponding players were analyzed, through the compilation of data on individual characteristics and performance. The use of a hedonic price model in this context was not disruptive, but allowed for the estimation of the impact of each player and club characteristic in the overall transfer value. In times of scarce resources for football clubs, it is essential to make rational, data-based decisions in relation to high value transfers. The use of a model such as the ones here developed can provide a prediction of a player's fair value, in function of his past performance and individual features.

Using OLS estimation, in line with the existing literature on this topic, two sets of models were developed: one featuring only player-related variables, such as physical characteristics and performance data, and another one adding club or transfer related variables (club reputation, for instance) to the first group. The result of the estimation showed that the players' sporting performance and individual characteristics does not explain the entirety of the fees in a transfer deal, with the inclusion of the small number of club related variables failing to significantly increase the explanatory value of the conceived model.

Nevertheless, the results obtained display that the inclusion of the performance rating was a move towards better comprehension of transfer fees in professional football. Performance rating was a key variable in this study, and the estimation indicated it is, as expected, a good proxy for transfer value. This index had not yet been featured in studies

such as this one, and presents the advantage of comprising the whole of the player's impact in a game, be it offensive or defensive.

Other apparently straightforward relations, such as the impact of goals, games for the National Team or, to a more limited extent, player popularity, were also confirmed by the results as positively influencing the fee paid by the buyer club. The most surprising conclusion regarding the analyzed sample would fall on the irrelevance of player position to the determination of the transfer fee. Here, results showed that fullbacks are less expensive than every other position, but indicated no differentiation between those. Understandably, a player's age has a negative effect in player value, indicating that potential is more expensive than experience. This seems to have been confirmed over the last season (not featured in this study, given its time scope), with several young players being traded for record amounts.

There is, thus, room for improvement in future studies. The inclusion of variables that were inaccessible for this study, for being undisclosed or of difficult access for past periods, such as agent representing the player, the player's current wage or number of months remaining in his present contract are expected to have a significant impact in the predictive power of the model. Following the same rationale, buyout clauses or future sell-on values can also make a difference in the transfer value. The interference of a third party on the transfer (an investment fund, for example) could be of some significance when studying past transfers, but loses some importance for the future due to its official ban by FIFA. A club's revenue can be regarded as a proxy for transfer budget, which may therefore influence the negotiation process and lead a selling club to demand more from a high revenue generating club than from a low revenue generating club. However, like in some of the aforementioned variables, many clubs have their income statements private, making the inclusion of this variable in the analysis more difficult.

Ideally, the next step in the study of this topic would be to include all of these factors and combine them with the technological advances in player performance analysis (such as the ratings made available by WhoScored), to build a model with a stronger explanatory value that can be in fact put to use by decision makers in the football business.

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Annexes

EViews outputs

Model A1

Dependent Variable: FEE
Method: Least Squares
Sample: 1 383
Included observations: 383
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AERIALS	-0.016561	0.589507	-0.028093	0.9776
AGE	-0.809567	0.105014	-7.709155	0.0000
ASSISTS	-0.632360	0.238225	-2.654462	0.0083
BUYCLUBREP	-0.002225	0.004583	-0.485600	0.6276
BUYLEAGUEREP	0.672754	0.329711	2.040431	0.0421
CLASSIFICATION	-0.018903	0.092250	-0.204910	0.8378
FIRSTXI	-0.495469	3.464948	-0.142995	0.8864
GAMESNT	0.318897	0.128089	2.489645	0.0133
GOALS	1.380125	0.439210	3.142289	0.0018
GOALSNT	0.706829	0.631153	1.119900	0.2635
GOALRATIO	-57.96445	20.84613	-2.780586	0.0057
GOOGLE	0.004426	0.002377	1.861642	0.0635
HEIGHT	-0.105157	0.044693	-2.352888	0.0192
MINS	0.001424	0.000723	1.969853	0.0496
MOTM	0.338616	0.385024	0.879467	0.3798
PASSING	0.155654	0.073044	2.130972	0.0338
RATING	4.210410	1.416928	2.971505	0.0032
RED	0.152103	0.805601	0.188806	0.8504
YELLOW	0.106216	0.152222	0.697772	0.4858
SELLCLUBREP	-0.012124	0.004799	-2.526228	0.0120
SELLLEAGUEREP	-0.917161	0.263195	-3.484723	0.0006
SHOTSPG	1.043537	0.852627	1.223908	0.2218
UCLGAMES	-0.025157	0.625158	-0.040240	0.9679
UCLRATING	3.568704	2.421288	1.473887	0.1414
UCL	-23.39597	15.25405	-1.533754	0.1260
WINTER	0.873017	1.183932	0.737388	0.4614
INTERNATIONAL	1.074900	0.906217	1.186140	0.2364
LOANED	-3.921740	0.967696	-4.052656	0.0001
LEFT	1.286550	1.996193	0.644502	0.5197
RIGHT	1.393828	1.696733	0.821477	0.4119
FORWARD	-0.571762	1.702576	-0.335822	0.7372
ATTMID	1.878048	2.024889	0.927482	0.3543
DEFMID	-0.669943	1.352027	-0.495510	0.6206
FULLBACK	-2.118794	1.171391	-1.808783	0.0713

R-squared	0.625429	Mean dependent var	8.663003
Adjusted R-squared	0.590011	S.D. dependent var	10.45430
S.E. of regression	6.693931	Akaike info criterion	6.724862
Sum squared resid	15638.24	Schwarz criterion	7.075341
Log likelihood	-1253.811	Hannan-Quinn criter.	6.863891
Durbin-Watson stat	1.987219		

Model A2

Dependent Variable: FEE
Method: Least Squares
Sample: 1 383
Included observations: 383
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AGE	-0.809492	0.105596	-7.665941	0.0000
ASSISTS	-0.667872	0.227483	-2.935918	0.0035
BUYLEAGUEREP	0.692401	0.313012	2.212064	0.0276
GAMESNT	0.310040	0.125137	2.477597	0.0137
GOALS	1.385930	0.427062	3.245268	0.0013
GOALSNT	0.654182	0.595979	1.097661	0.2731
GOALRATIO	-59.14671	20.09437	-2.943447	0.0035
GOOGLE	0.004390	0.002296	1.911911	0.0567
HEIGHT	-0.102139	0.039967	-2.555549	0.0110
MINS	0.001450	0.000465	3.117950	0.0020
MOTM	0.358630	0.372729	0.962174	0.3366
PASSING	0.150781	0.059685	2.526279	0.0120
RATING	4.277445	1.294139	3.305244	0.0010
SELLCLUBREP	-0.011642	0.004254	-2.736522	0.0065
SELLLEAGUEREP	-0.914854	0.244831	-3.736675	0.0002
SHOTSPG	0.988322	0.736622	1.341696	0.1805
UCLRATING	3.609353	2.224509	1.622539	0.1056
UCL	-23.71363	15.04996	-1.575661	0.1160
INTERNATIONAL	1.285056	0.851312	1.509500	0.1320
LOANED	-4.129977	0.903612	-4.570519	0.0000
ATTMID	2.448564	1.270982	1.926514	0.0548
FULLBACK	-1.667579	0.835952	-1.994826	0.0468

R-squared	0.622352	Mean dependent var	8.663003
Adjusted R-squared	0.600384	S.D. dependent var	10.45430
S.E. of regression	6.608710	Akaike info criterion	6.670379
Sum squared resid	15766.69	Schwarz criterion	6.897159
Log likelihood	-1255.378	Hannan-Quinn criter.	6.760339
Durbin-Watson stat	1.970293		

Model A3

Dependent Variable: FEE
Method: Least Squares
Sample: 1 383
Included observations: 383
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AGE	-0.807909	0.107101	-7.543410	0.0000
ASSISTS	-0.576370	0.232181	-2.482413	0.0135
GAMESNT	0.449871	0.116920	3.847682	0.0001
GOALS	2.062588	0.410262	5.027492	0.0000
GOALRATIO	-82.73928	18.04821	-4.584348	0.0000
HEIGHT	-0.124825	0.044186	-2.825027	0.0050
MINS	0.001406	0.000475	2.960318	0.0033
RATING	7.321373	1.360609	5.380955	0.0000
SELLCLUBREP	-0.018007	0.004439	-4.056938	0.0001
SELLLEAGUEREP	-0.758636	0.198395	-3.823864	0.0002
LOANED	-4.187353	0.971789	-4.308913	0.0000
ATTMID	2.922080	1.347046	2.169251	0.0307
FULLBACK	-2.182089	0.803159	-2.716884	0.0069

R-squared	0.567212	Mean dependent var	8.663003
Adjusted R-squared	0.553176	S.D. dependent var	10.45430
S.E. of regression	6.988165	Akaike info criterion	6.759666
Sum squared resid	18068.75	Schwarz criterion	6.893673
Log likelihood	-1281.476	Hannan-Quinn criter.	6.812824
Durbin-Watson stat	2.042318		

Model B1

Dependent Variable: FEE
Method: Least Squares
Sample: 1 383
Included observations: 383
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AERIALS	-0.149889	0.625294	-0.239710	0.8107
AGE	-0.791751	0.108567	-7.292751	0.0000
ASSISTS	-0.601381	0.243035	-2.474461	0.0138
FIRSTXI	-1.976321	3.127280	-0.631962	0.5278
GAMESNT	0.356364	0.135526	2.629481	0.0089
GOALRATIO	-71.47092	21.21429	-3.368998	0.0008
GOALS	1.632994	0.465853	3.505385	0.0005
GOALSNT	0.838418	0.662171	1.266164	0.2063
GOOGLE	0.004858	0.002420	2.007360	0.0455
HEIGHT	-0.119830	0.047362	-2.530111	0.0118
MINS	0.001280	0.000588	2.178201	0.0300
MOTM	0.229362	0.389269	0.589211	0.5561
PASSING	0.167359	0.073040	2.291331	0.0225
RATING	4.326370	1.456783	2.969811	0.0032
RED	0.204975	0.814874	0.251541	0.8015
SHOTSPG	1.294604	0.856114	1.512186	0.1314
UCL	-28.65958	15.38970	-1.862258	0.0634
UCLGAMES	-0.161678	0.619649	-0.260919	0.7943
UCLRATING	4.561822	2.421747	1.883690	0.0604
YELLOW	0.106565	0.154784	0.688479	0.4916
RIGHT	1.471289	1.797233	0.818642	0.4135
LEFT	1.523844	2.063097	0.738620	0.4606
FORWARD	-1.938772	1.749891	-1.107939	0.2686
ATTMID	0.795892	2.079170	0.382793	0.7021
DEFMID	-1.393795	1.383430	-1.007492	0.3144
FULLBACK	-3.069919	1.128263	-2.720925	0.0068

R-squared	0.594751	Mean dependent var	8.663003
Adjusted R-squared	0.566372	S.D. dependent var	10.45430
S.E. of regression	6.884203	Akaike info criterion	6.761807
Sum squared resid	16919.03	Schwarz criterion	7.029820
Log likelihood	-1268.886	Hannan-Quinn criter.	6.868123
Durbin-Watson stat	1.983899		

Model B2

Dependent Variable: FEE
Method: Least Squares
Sample: 1 383
Included observations: 383
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AGE	-0.806301	0.109141	-7.387674	0.0000
ASSISTS	-0.639788	0.224209	-2.853532	0.0046
GAMESNT	0.355908	0.134989	2.636564	0.0087
GOALRATIO	-76.27541	20.68009	-3.688351	0.0003
GOALS	1.742781	0.454120	3.837707	0.0001
GOALSNT	0.697934	0.628482	1.110507	0.2675
GOOGLE	0.004785	0.002500	1.914216	0.0564
HEIGHT	-0.131667	0.039451	-3.337494	0.0009
MINS	0.001575	0.000466	3.376770	0.0008
PASSING	0.158858	0.060729	2.615842	0.0093
RATING	4.666339	1.115946	4.181508	0.0000
SHOTSPG	0.895776	0.765652	1.169953	0.2428
UCL	-27.81444	15.19140	-1.830933	0.0679
UCLRATING	4.304482	2.244301	1.917961	0.0559
ATTMID	2.316155	1.322830	1.750910	0.0808
FULLBACK	-2.362754	0.769848	-3.069119	0.0023

R-squared	0.589190	Mean dependent var	8.663003
Adjusted R-squared	0.572399	S.D. dependent var	10.45430
S.E. of regression	6.836190	Akaike info criterion	6.723216
Sum squared resid	17151.19	Schwarz criterion	6.888147
Log likelihood	-1271.496	Hannan-Quinn criter.	6.788642
Durbin-Watson stat	1.968879		

Model B3

Dependent Variable: FEE
Method: Least Squares
Sample: 1 383
Included observations: 383
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AGE	-0.814815	0.111766	-7.290345	0.0000
GAMESNT	0.460427	0.124154	3.708519	0.0002
GOALRATIO	-80.71105	17.88766	-4.512109	0.0000
GOALS	1.945074	0.389069	4.999306	0.0000
GOOGLE	0.005089	0.002535	2.007668	0.0454
HEIGHT	-0.098147	0.033353	-2.942704	0.0035
MINS	0.001004	0.000471	2.130849	0.0338
PASSING	0.175117	0.058252	3.006180	0.0028
RATING	3.759286	1.063487	3.534867	0.0005
FULLBACK	-2.312604	0.744333	-3.106950	0.0020

R-squared	0.559626	Mean dependent var	8.663003
Adjusted R-squared	0.549001	S.D. dependent var	10.45430
S.E. of regression	7.020741	Akaike info criterion	6.761377
Sum squared resid	18385.47	Schwarz criterion	6.864459
Log likelihood	-1284.804	Hannan-Quinn criter.	6.802268
Durbin-Watson stat	1.967749		