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Moving Abroad: Exploring the Effect of League Choice in Football Player Valuation

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Abstract

This thesis investigates the relationship between football players' market value development, and which league they play in having made their first international transfer. The study includes players in the striker position from European countries outside those with the 10 highest ranked leagues, according to UEFA's ranking, who have made a transfer into one of the top 10 leagues. To measure the effect league choice has on market value change the top 10 leagues were divided into two tiers, T1 (top 1-5 leagues) and T2 (top 6-10 leagues). To quantify if the quality of league has an impact on how well a player develops during his spell there, three different Ordinary Least Squared (OLS) regressions were set up, all indicating that league choice and quality does not significantly impact a player's market value development. We find that performance-related statistics such as goals and minutes played are of significance, as well as characteristics such as age and duration at the club. These findings contribute to previous literature by clearly indicating which league a player moves to does not impact his market value development. It also further supports conclusions regarding significant value drivers, while using a vastly different sample.

Keywords: Football, Valuation, Hedonic pricing, Job mobility

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1. Introduction

The global football industry has grown rapidly over the years and is no longer considered simply a sport, but a multibillion-euro industry, with an increasing number of clubs becoming huge businesses listed on stock exchanges. The exponential growth of the football industry in terms of globalization and commercialization has given rise to new questions and challenges for football clubs and related stakeholders (Toma and Catana, 2021). A measure of how large the industry has become is the size of the global football transfer market, which as of 2024 amounted to €10.96 billion in transfer fees and add-ons related to the signing of football players (Poli, Ravenel and Besson, 2024). Football players are the most valuable assets on the football club's balance sheet and signing a new player is a significant investment for the club. Thus, how a football player should be treated from an accounting perspective is of great importance and it has changed over time. The discussion first started in the 1970s and revolved around the concept of human resource accounting in financial documents (Brummet, Flamholtz and Pyle, 1968). Later, the discussion moved towards intangible assets which is how football players are perceived from an accounting perspective today, and the industry has established a common accounting practice where football clubs are obliged to follow the rules of the IAS (Gazzola, Amelio, Fragkoulis and Vătămănescu, 2019). Given the economic significance and stricter accounting regulations, determining a fair value of a football player before either buying or selling the player is important for all football clubs. However, there is still uncertainty regarding which factors drive the value of football players and many aspects are still to be explored.

Modelling football player valuation has taken many approaches, starting with an analysis of the relationship between transfer fees paid and the attendance and playing success of the buying club. Factors such as risk attitude and current club situation are also discussed and deemed to be important factors when determining a transfer fee (Carmichael and Thomas, 1993). In later studies more focus has been put on the variables driving the market value of a football player rather than the transfer fee paid. Although using the transfer fee paid as a proxy for the market value of a player seems like the closest measure of the actual market value, it has limited attributes such as only being applicable for players who have been transferred for a fee. A football player's market value is frequently changing since it is driven by many different variables related to performance and characteristics. Football player transfers can be structured in various ways and do not necessarily include a transfer fee. Transfers without a fee became a more frequent practice following the Bosman ruling in 1995, allowing players whose contract

ran out to move freely between European clubs (Binder and Findlay, 2016). Therefore, market values, available on the website transfermarkt.com (TM), are commonly used as a proxy for player valuation, since it is available for all players and is frequently updated (He, Cachucho and Knobbe, 2015).

The factors that significantly drive player values have been studied in various ways, and there are both agreements and differing conclusions about which factors are most important. In terms of player characteristics, earlier research has found that age, age squared, participation in national team and remaining contract duration are significant factors in player valuation (Serna Rodríguez, Hassan and Coad, 2019; Poli, Besson and Ravenel, 2022). Player performance factors such as goals, assists, yellow and red cards, minutes played and appearances are commonly used in the valuation model, but conclusions about their significance are not always the same. Some studies mean that goals scored have a positive impact on player value, while not being as important as the previously mentioned player characteristics (Serna Rodríguez et al., 2019). Others mean that all player performance statistics can be captured by the player's media visibility, which serves as a measure of player talent and their other characteristics (García-del-Barrio and Pujol, 2020). Even though different conclusions have been reached regarding these variables, they are usually included and controlled for in the models (Franceschi, Brocard, Follert, and Gouguet, 2024).

The samples used in research on football player valuation are dominated by Europe's top five leagues, determined by UEFA's official league ranking (Franceschi et al., 2024). In 2024 these leagues (the first divisions in England, Italy, Spain, Germany and France) made up 62.5% of the total global transfer market investments, measured by transfer fees and add-ons, showcasing the dominance of these five associations (Poli et al., 2024). The clear division between the top five leagues in Europe, both financially and quality wise, has sparked an interest in measuring the effect of job mobility and the league or club strength on player values. By using the UEFA club coefficient as a proxy for club strength, it has been shown that making an upwards move (transferring to a club with a higher coefficient value) positively impacts a player's market value (Velema, 2019). However, it remains unclear whether this is applicable at a broader league level, and if the extent of the upwards move has any significance.

No football players are directly comparable since each player has unique abilities and characteristics. Therefore, a commonly used modelling approach is hedonic pricing models. To

make the players included in the dataset comparable, one needs to break down their idiosyncratic characteristics and price each one individually (Gerrard, 2001). In this sense football player valuation can be compared to real estate valuation which also breaks down and prices individual characteristics separately to determine its effect on the overall value (Rosen, 1974).

While many characteristics and performance statistics of football players have been tested, and both consistent and contradicting conclusions have been drawn, there is a missing piece in the literature when it comes to the sample selection of players and transfers used. Most studies look only at the top 5 leagues, while some include one or two of the top ranked leagues outside of the top 5. However, other leagues are generally overlooked, and many of the players that transfer within or between the top 5 leagues are already the highest valued players from the countries where these leagues are based. This means that players from countries with a less notable presence in the absolute football elite generally are not included if they are not already what is to be considered a superstar. Thus, there is a sampling gap both in terms of omitting players who move from lower ranked leagues to leagues just outside the top 5, and in terms of players who are from these countries in general. Our study, which primarily will look at a European striker's first international transfer into one of the top 10 ranked leagues according to the UEFA ranking from 2024, will observe how the choice of league has a significant or insignificant effect on his future market value. Doing this, we can observe if there is an observable difference in market value development depending on if one joins a higher or lower ranked league. Simultaneously, we are also testing whether the positive and negative value drivers are coherent with what earlier research has found, but with a sample which has not been frequently represented previously.

Our study contributes to previous literature firstly, by using a vastly different sample selection, only including players from countries outside the top 10 ranked leagues according to UEFA's associations ranking. Secondly, our study adds further support for the variables which already are deemed to be significant value drivers for football players by including these variables in all our models as control variables. Our primary contribution, however, is adding a new variable to the model which has been omitted in previous research. We include different variables which measure the significance of league choice for players who make an international move into one of Europe's most competitive leagues. This is of interest to the field of football player valuation since it determines if the league quality contributes to the players' development while being

under contract at that club, where the player's development is measured by his change in market value during his spell in the club/league. Earlier literature has not considered whether league quality is related to how well the player develops in that environment.

To answer our research question, whether the league a player joins has an effect on his future market value, we have produced a sample consisting of 336 observations with data gathered from TM. Included in the data was each player's market value at the point of making their first international transfer into either one of UEFA's top 1-5 (T1) leagues or 6-10 (T2) leagues. The market value of the players at the point at which they make their subsequent transfer was also gathered to capture the change in market value during their stay at the T1 or T2 league. To make our study more robust we created three different models which all measure the effect league choice has on player value change. The models share the same dependent variable and control variables, but the independent variable changes. Model 1 measures if there is an effect on market development value if a player has experience from a T2 league before joining a T1 league, compared to moving directly to a T1 league. Model 2 measures if there is a significant difference in value development depending on if a player joins a T1 or T2 league as his first international move. Model 3 observes if moving to a T1 league and being loaned out from that club has any significant effect compared to joining a T1 league without being loaned out or joining a T2 league. The results from our three models are all coherent. There is no effect on a player's market value development related to which league he plays in, suggesting that the developmental environment in T1 and T2 leagues are similar and does not affect market value. Rather, market value is driven by performance-related factors.

2. Literature and theory

This section includes important theories and conclusions from earlier research which are required to make sense of our study and motivates our research question. We begin in section 2.1 with theories of job mobility and hedonic pricing, linking them to the world of football and the acquisition of football players through the transfer market. Section 2.2 continues with some different views of the largest value drivers of football players' market values from earlier research. In section 2.3 we will define the gaps in earlier research, motivate why our study is needed and how it adds value to the question of football player valuation. Lastly, section 2.4 will present the hypotheses we will test in our study.

2.1 Economic Theory behind player valuation

2.1.1 Job mobility

Job mobility refers to patterns of internal and external job transitions throughout a person's career (Ng, Sorensen, Eby and Feldman, 2007). Knowledge about candidates' attributes is crucial to the employers, and gaining such knowledge is more complex in external recruiting when compared to internal recruiting where the employer has ready access to references and may already have worked with the candidate on earlier occasions. It is reasonable to draw the conclusion that this has played a part in the emergence of typecasting, defined as the tendency of employers to favor candidates perceived to have demonstrated the necessary skills for a specific role through previous successful performances in similar roles. This practice is commonly used in labor markets suffering from imperfect information, and thus, earlier success in a role works as a highly important signal for candidates in these markets (Zuckerman, Kim, Ukanwa and Von Rittman, 2003).

Another similar signal for an employer is the job history data (job hopping, absences from work, lateness's to work, periods of unfilled time, reasons for leaving past employers, and past wage rate) of a candidate. This may reveal both positive and negative earlier performances in similar roles. Job history information also fulfills the three merits rooted in the scarcity of labor market information and the role of transaction costs in staffing decisions which are commonly attributed to educational credentials. It is relatively cheap to acquire, easily observable, and is a generally socially acceptable method to screen a candidate (Bills, 1990).

In football, the talent of a specific player is hard to measure due to the difficulty in assessing the contribution of a particular player to the overall team product (Franck and Nüesch, 2008). Job mobility can be linked to a player's market value by looking at the impact of upward and downward movements, i.e. a transfer to a higher or lower ranked club than the one a player is currently contracted by, using the UEFA coefficients as proxies for club ranking. Here, upward job moves increase the market value of a football player, and the effect is cumulative meaning that each move up has a larger increase on the market value. Such a cumulative effect is not found for downwards movements, which decrease the players market value with a reducing impact for each move down. Additionally, downward moves have less effect when the player takes on a more important role in the new team (Velema, 2019).

Further on, it has been shown that fixed-term workers wage growth can be attributed to (1) their recent job mobility and (2) the duration of the contract held. This effect is especially relevant for fixed-term contracts lasting less than six months. The wage growth is also larger for fixed-term workers who get to stay at their job beyond their contract which could be explained by them making more effort to gain the opportunity to keep their jobs (Amuedo-Dorantes et al., 2007). Connecting this to football players requires some tweaks, as there are no football players with indefinite contracts, and the contracts often last for longer than six months. However, a player is still able to fight for an extended contract at their current club with an increased wage and can also gain wage increases from job mobility and upwards movements. Since information on player wages is not always easily accessible, one can substitute the wage growth measure with market values as market values have shown to be good proxies for player wages (Prockl and Frick, 2018). This simplifies the attempt to quantify the job mobility and duration effect in a football player setting.

2.1.2 Hedonic prices and the hedonic-pricing technique

An investment asset is an asset held by a large number of investors for investment purposes such as stocks, bonds and gold. If assumptions about no transaction costs, equal tax rates on trading profits, equal interest and risk-free rates for lending, and a desire to take advantage of arbitrage opportunities (locking in riskless profit by entering into at least two markets at once) hold approximately true for a few key market participants, the principle of no arbitrage will be held up. Market makers will set prices to exclude any arbitrage opportunities, and if they were to occur, they will instantly be utilized until the prices in and between all markets will no longer satisfy the conditions to lock in riskless profit. To understand the relationship between future and spot prices for investment assets, understanding the cost of carry is crucial. The cost of carry is essentially the total cost of storing an asset and financing it, less the income earned on the asset while it is held. A dividend paying stock for example is free to hold, and its cost of carry is thus the interest payments made to finance it minus the dividends earned while holding it. Further on, this explains how an investment assets value is based on its future cash flows and arbitrage principles. For these principles to work however, assumptions about at least the weak form of market efficiency (the present value of an investment asset reflects all historical price information) and risk-neutral valuation (investors required expected returns will not increase when risk does) are also crucial (Hull, 2012).

However, other kinds of assets cannot rely on these assumptions and principles, as they have attributes which require adaptation in their treatment. Assets such as real estate will include transaction costs, lengthy buying processes, and prices set based on a bidding or negotiation process from an estimated value. For these assets, we can instead turn to hedonic prices. Hedonic prices are the implicit prices of the specific characteristics associated with a good, and the price of a good is the sum of the characteristic-specific prices. It has been concluded that treating goods as packages of different characteristics enables comparability between observed market prices. Further, the differences in prices reflecting the varying characteristics of the goods are at least on the margin equalizing differences, i.e. compensating for differences in characteristics, making each good equally attractive to different consumers (Rosen, 1974).

The Hedonic-pricing technique decomposes the price of an asset into a set of hedonic prices for the individual characteristics that constitute the asset through statistical analysis and thus provides a total value for an asset based on the individual contribution of its attributes (Gerrard, 2001). However, the method dates back to 1939 when A.T. Court suggested that the relative importance of different characteristics of cars (e.g. horsepower, seat width, window area etc.) to buyers in combination with data on the characteristics could be used in order to create an index that enabled comparison between different cars in terms of price, based on their individual attributes. The advantages of this proposed method were the enabling of distributing weights on an objective basis to the various car specifications, the allowance of each different observation to be assigned a weight instead of treating all observations equally, the ability to capture both short- and long-term price shifts, and the large number of specifications that the technique can handle (Court, 1939).

Using the hedonic-pricing technique in valuation of football players was first proposed by Gerrard (2001) who recommended the construction of a composite player quality index (PQI) which would be based on observable characteristics of the player such as age, experience and previous performance levels, all measured before the performance to be studied. The motivation behind this proposal was the fact that it would be a forecast rather than a subjective assessment of a players' quality and the ability to aggregate the individual players PQI scores into a team quality index. To develop the PQI the hedonic-pricing technique was deemed appropriate as it would enable both player wages and transfer fees to identify the observable attributes that provide efficient predictors of future playing performance and a weighting system required for the PQI (Gerrard, 2001).

2.2 Previous literature on football player valuation

The overarching goal of the football transfer markets should be to enable clubs who are seeking to improve their team and perform better on the pitch to do that by facilitating and organizing acquisitions and exchanges of players. It also functions as a channel for players who are looking for better opportunities, higher salaries, and/or increased job satisfaction to do so through a move to a new club. The markets are regulated and clubs have the right to approach a player with a contract proposition first after the club that the player is currently under contract with has agreed upon a transfer fee for the loss of service (Carmichael et al., 1993). Additionally, up until the Bosman ruling in 1995 which enabled players out of contract to move freely between clubs in Europe (Binder et al., 2016), a club was entitled to a transfer fee for a player they had offered a new contract to. The terms of the contract had to be least as good as the last contract upon its expiry, and if the player decided to reject the contract and to join another club a transfer fee from the club acquiring the player out of contract was required. (Carmichael et al., 1993).

In the first academic attempt to formally model transfer fees, Carmichael et al. (1993) found evidence supporting a positive relationship between a higher transfer fee, attendance, and playing success for the buying club, implying weakened bargaining power for the buying club. They also reason that one of the most important factors for the buyer is its risk attitude, and that clubs may pay too high transfer fees to direct competitors, i.e. other clubs in the same domestic league due to inflated or pre-emptive bids to capture players, especially when a club is in the first division and have concerns about being relegated. These factors imply that transfer fees may be affected by specific characteristics and situations of the buying club which adds uncertainty to whether the actual value of a player and the transfer fee paid for his services are aligned or if there is a large difference between the two.

There are thus some issues with using transfer fees as market values, which from here on instead refers to the estimated transfer fee that any club is most likely going to pay for the player in the case of a transfer (Müller, Simons, and Weinmann, 2017). While the transfer fee is most likely the closest we can get to a factual market value for a player, and there are conceptual differences between it and market values from sources such as TM, they are comparable, and market values do not have issues such as only existing for players who have actually made a transfer, and risk of outdatedness if the players' performances have changed a lot since the occurrence of the

transfer as they are updated frequently (He et al., 2015). Additionally, market values have proven to be excellent proxies for both current and future player wages (Prockl et al., 2018).

In academic research, many scholars have reached conclusions about what variables have the most influence on the market value of a football player. Some of these are age, age squared, participation in either under-21 or senior national team (Serna Rodríguez et al., 2019). Additional significant factors that have been found are the remaining length of the current contract, minutes in senior games during the 24 months preceding the transfer, inflation in the transfer market and the economic strength of the buying club (Poli et al., 2022).

Regarding performance statistics such as goals, assists, yellow cards, and red cards, there are differing views among researchers. It has been concluded that goals scored during a player's career has a positive effect, although it is not as important as age, age squared, and national team (Serna Rodríguez et al., 2019). Others have found that these types of performance variables can be captured by the number of matches played. However, goals, assists and yellow cards are significant when matches played are not included as a variable (Velema, 2019). These factors can also be entirely captured by the media visibility of the player, which can also measure other player contributions beyond sporting talent and performance (García-del-Barrio et al., 2020).

2.3 Gap in the literature

There have been many different approaches used to model football player valuation. The question has been investigated using Nash's bargaining theory which has proven to be a well-fitting framework for the football transfer market (Carmichael et al., 1993). Teams and leagues have also been ranked to be able to look at football player valuation from a job mobility perspective through upwards and downwards moves based on the teams ranking which also proved to be a relevant method to look at how the moves affected player's market values over time (Velema, 2019).

There are many variables shown to have a statistically significant effect on a player's market value, and as of 2021 there were more than 3000 papers related to transfer fees, player prices, and players values in football (Franceschi et al., 2024). While the methods and conclusions somewhat differ between papers, something that is very common is that the researchers only look at players from a few of the, or the entire set of top 5 leagues. This is where the main gap

in the research exists. In their systematic literature review, Franceschi et al. (2024) proposes future research to move away from this tendency and investigate some of the leagues just out of the top 5 such as the Portuguese Primeira Liga and the Dutch Eredivisie. Further on Serna Rodríguez et al. (2019) presents an opportunity to observe football players from the viewpoint of specific leagues and positions to develop the understanding of both positive and negative values drivers for different leagues and sports in order to understand the market value of athletes in a broader context than just football. Lastly, Velema (2019) suggests future research to look at players from less prominent football nations (outside of England, Spain, Italy, France, Germany, Portugal, and the Netherlands) and how their moves to the big leagues affect their market values.

Considering the gap we have identified and both different and somewhat similar proposals from earlier research, we see a clear need for research into (1) the leagues outside of the top 5, and (2) players from countries outside of the top leagues. Thus, we have decided to include the top 10 ranked European leagues from the 2023/2024 UEFA ranking and split them into two tiers to separate the top 5 from the top 6-10 and include them in our study. Then, we will look at how the league choice for the first international transfer to one of the top 10 leagues for players who play in the striker position from countries in Europe, whose domestic league is outside this top 10 ranking, affects their market value.

This paper thus adds to the existing research on football valuation through adding a league variable to see whether the league choice has an impact on the market value, and by only looking at players from less prominent footballing nations in terms of football league quality to determine whether both the positive and negative value drivers found in earlier research are different for such players.

2.4 Hypotheses

Following the theory and earlier research discussed in sections 2.1-2.3 we have developed the following hypotheses:

Hypothesis 1

H_0: There is not a significant effect on the change in football players' market value development depending on if they join a top 5 league for their first international transfer rather than moving to a top 6-10 league first and then joining the top 5.

H_1: There is a significant effect on the change in football players' market value development depending on if they join a top 5 league for their first international transfer rather than moving to a top 6-10 league first and then joining the top 5.

Hypothesis 2

H_0: There is not a significant effect on the change in football players' market value development depending on the choice of league tier (top 5 vs. top 6-10) for their first international transfer.

H_1: There is a significant effect on the change in football players' market value development depending on the choice of league tier (top 5 vs. top 6-10) for their first international transfer.

Hypothesis 3

H_0: There is not a significant effect on the change in football players' market values from joining a top 5 league for their first international transfer and being loaned out rather than staying in the top 5 league or moving to a top 6-10 league instead.

H_1: There is a significant effect on the change in football players' market values from joining a top 5 league for their first international transfer and being loaned out rather than staying in the top 5 league or moving to a top 6-10 league instead.

3. Method

3.1 Sample selection

This study relies on data related to several different player characteristics which may be of significance when determining what makes a football player valuable. The data used in this study is primarily collected from TM. TM is a large, German, online community that evaluates the market values of professional football players. Granted, the values reported on TM are not strictly official values, they function as widely accepted proxies when conducting empirical research on player valuation. The community is the main source for reporting market values in the media and are acknowledged to be accurate in its market value estimates (Herm, Callsen-Bracker and Kreis, 2014).

The criteria for what data to collect from TM was primarily based on the work from earlier research on football player value drivers, suggesting that there are about ten different statistics and characteristics which are widely used and of significance (Franceschi et al., 2024). To create a more homogeneous dataset we limited our sample selection by only collecting data for players who make their first international move from their domestic league to either a top 5 league or a top 6-10 league. Since previous work indicates that positional differences can impact player valuation, the sample was further limited to only the striker position, as defined by TM, to make each player more comparable and increase the controllability of our data (Hughes, Caudrelier, James, Redwood-Brown, Donnelly, Kirkbride and Duschesne, 2012). TM has data available from 2004 to today which thus serves as our period in scope in this study. Players who made their first international transfer between 2004 and 2024 are included in our sample. Players who made their transfer before 2004 are excluded due to limited data availability, and players who made their transfer in 2025 are also excluded due to limited data on their updated market value.

To capture the effect of job mobility on player market value development we collected market values for each player at two different points in time. The first market value is at the time of their first international transfer into a top 5 league or a top 6-10 league. The second market value is at the time of their subsequent transfer. We have also collected the same data but from a subsample for players who made their second transfer from a top 6-10 league to a top 5 league and their statistics in the top 5 league. However, our dataset also includes players who have not made a subsequent transfer. To keep the observations in our dataset comparable we calculated the average duration (2 years) for players who have made a second transfer in our dataset and used this as a basis for which market value to use. Thus, we chose to collect the market value available two years from the first transfer for the players without a subsequent transfer. If there was not a market value exactly two years from the first transfer, we chose the nearest available value before it. If a player made a move less than two years ago, we collected the latest market value available. This is consistent with previous literature which states that football player employment spells usually are around two years long (Velema, T. A. 2019).

European football leagues change over time in terms of which clubs are included in the league. Since we have players who have moved into our leagues of interest over a 20-year period, we collected data from TM on which clubs were in which league each of those years.

The date at which the player made his first international transfer is matched to the league that season to ensure we do not include players who have moved to a club that may have been in a lower tier division at the time of the transfer.

The data was initially collected by scraping TM with code written in python. In the process of cleaning the dataset all observations used in the regression model have been manually checked to ensure they fulfil the sample selection criteria. Thus, the final dataset consists of 336 fully controlled observations.

3.2 Variables

For us to investigate if there is a relationship between the change in market value of a football player and which league he chooses to join we must determine an appropriate dependent variable which reflects the market value change. Additionally, we must clearly identify our independent variable and relevant control variables.

3.2.1 Measuring the market value change of a football player

Our study primarily seeks to understand if there is a significant relationship between which league the player joins when making his first international transfer and the players' market value change during his stay at that club. In previous research, the dependent variable has commonly been the logarithmic value of the players market value from TM (Serna Rodriguez, 2019). The dependent variable in our model must capture the change in market value for a specified period. As mentioned in Section 2.1.2, we apply the theory of hedonic pricing to our model, which traditionally uses real values as the dependent variable (Monson, 2009). Since we want to capture the value change while still following the hedonic pricing approach, our dependent variable is the logarithmic market value change for the period previously specified. This allows us to use real values while also capturing market value development.

3.2.2 Determining league strength

European football leagues differ in size and quality. The leagues which as of the 2023/2024 season were ranked places 1-5 on UEFA's national associations ranking, are generally referred to as the top 5 leagues in European football. These leagues (the first divisions in England, Italy, Spain, Germany and France) are overwhelmingly used as the subject of football player valuation studies (Franceschi et al., 2024). Since there seems to be a clear division between the five highest ranked leagues and the rest of the leagues on the UEFA national associations ranking, we have divided them into two tiers, T1 and T2. The T1 leagues consists of the first

divisions in the countries already mentioned, and the T2 leagues consists of the first divisions in The Netherlands, Portugal, Belgium, Turkey and Czech Republic (UEFA. Men's Association Club Coefficients Ranking – UEFA Rankings 2023/2024). The T2 leagues were determined simply by choosing the leagues ranked 6-10. There are fluctuations in league strength from year to year and since our study spans from 2004 to 2024, the league rankings have not been the same every year. However, the T1 leagues have been almost exclusively ranked 1-5 over these 20 years, and we thus deem it acceptable to group them together as the higher tier of leagues for our purposes. There is more fluctuation in the leagues ranked 6-10, however, these leagues are generally close in ranking points which means that there is little to no difference when choosing between which countries to include. For simplicity we have therefore chosen the 6-10 ranked leagues as of 2023/2024.

The T1 and T2 grouping serves as a binary variable in our model, where it takes the value 1 if it is a T1 league and 0 otherwise. We are interested to see if players have a better opportunity to increase their market value if they make their first international move to a high-quality league or a lower quality league. For robustness, we have constructed three different models where we use different independent variables which all measure the effect of league choice in relation to market value development.

Model 1

Our first independent variable measures if there is a significant effect in market value change if a player joins a T1 league directly, or if he first joins a T2 league and then joins a T1 league. We call this variable T2EXP in our model. When observing the result, we get an indication if it matters which league a player joins. A significant and positive result would indicate that moving to a T2 league before subsequently joining a T1 league will raise the players' market value more than if he joins a T1 league directly. An insignificant result means that the league choice does not have an impact on market value change.

Model 2

The second independent variable measures if there is a difference in market value development depending on if a player joins a higher quality league directly (T1) or a lower quality league directly (T2). In this model we measure the impact of league choice on market value change more directly. Is there a significant difference in market value development

depending on if you join a T1 or T2 league when making your first international transfer, or does it not impact market value change? We call this variable T1 in our second model.

Model 3

To further enhance our study's robustness, we include a third model with an independent variable called T1LOAN. This variable measures if moving to a T1 league directly and being loaned out while at that club has a significant effect on market value change compared to either moving directly to a T2 league or to a T1 league but not being loaned out. Once again, we measure if the choice of league has an effect on market value change, but we control for the factor of being loaned out to see if it has a significant effect.

3.2.3 Control variables

There are several variables which are considered significant value drivers of players market value. We control for statistics related to player performance; goals, assists, yellow cards, red cards and total minutes played. Age at the time of the transfer is another important consideration included in our model. National team status is also included as a binary variable which takes the value 1 if a player has made at least one appearance for his national team. Which foot (left, right or both) the player prefers to play with is also one of the most commonly used variables included in player valuation models and is therefore controlled for in our study as well (Franceschi et al., 2024). Loan transfers are common on the European transfer market, and they are present in different ways in our sample. There are four categories regarding loan transfers. 1) A player was transferred from his domestic league to a T1 or T2 league on loan and then returned to his domestic league when the duration of the loan ended. 2) A player was transferred from his domestic league to a T1 or T2 league on loan and was then permanently transferred to that club immediately after the loan transfer ended (loan to buy). 3) A player was permanently transferred to a T1 or T2 league and was loaned out from his new club one or several times while still being owned by the T1 or T2 club. 4) A player was permanently transferred to a T1 or T2 league and did not make any loan transfers. Previous research suggests that loan transfer does not necessarily significantly impact the market value of a player. Therefore, in models 1 and 2, we have simply added the statistics generated at the loan clubs to the statistics generated at the T1 or T2 club for the players in the third category. The duration of which a player stayed at the T1 or T2 club is also included as a control variable since it is deemed to have a significant impact on player value (Velema, 2019).

Table 1 Variables and definitions

Variable	Definition
lnΔMV	Natural logarithm of the change in market value between the initial transfer and the next time point.
T2EXP	Dummy variable where 1 means that a player has experience from a T2 league before joining a T1 league while 0 means that the player made his first transfer to directly to a T1 league.
T1	Dummy variable where 1 means that a player moved to a T1 league for his first international transfer and 0 means that the player moved to a T2 league.
T1LOAN	Dummy variable where 1 means that the player moved to a T1 league and then was loaned out and 0 means that the player either stayed at his T1 club or joined a T2 league.
Age	The players age when he made his first international transfer.
Age squared	The square of the players age when he made his first international transfer.
National team	Dummy variable where 1 means that the player has played at least one game for his national team and 0 means that the player has not played any games for his national team.
Duration	The duration of the session in the club where a player moved for his first international transfer.
Foot	The preferred foot of the player where 1 means right, 2 means left, and 3 means no preference.
Goals	Number of total goals scored within the time span, regardless of scoring for owner club or while on loan.
Assists	Number of total assists made by a player within the time span, regardless of assisting for owner club or while on loan.
Yellow cards	Number of total yellow cards awarded by a player within the time span, regardless of happening for owner club or while on loan.
Red cards	Number of total red cards awarded by a player within the time span, regardless of happening for owner club or while on loan.
Minutes	Number of total minutes played by a player within the time span, regardless of playing for owner club or while on loan.

3.3 Research design

The objective of our study is to estimate which factors influence the change in a football player's market value over time, with a focus on league choice. A football player's market value is driven by idiosyncratic characteristics which make each player unique assets (Franceschi et al., 2024). Using the hedonic regression approach as a basis for our models allows us to correct for the heterogeneity among the players (Sopranzetti, 2015). However, since we want to consider the change in market value our approach cannot be considered to strictly follow the hedonic pricing model since it traditionally prices the complete value rather than the value change.

3.3.1 Model 1

To appropriately measure the change in market value of the players, our dependent variable is the logarithmic change in market value, based on the duration variable described in Section 3.2. We investigate the relationship between our independent variable and control variables with the dependent variable by estimating a generalized ordinary least squared (OLS) regression model:

$$ln\Delta MV = \alpha + \beta_1 T2EXP + \Sigma Player\ controls + \varepsilon$$

where $ln\Delta MV$ is our dependent variable. T1EXP is our independent, binary variable described in Section 3.2.2 and $\Sigma Player\ controls$ are all player control variables described in Section 3.2.3.

3.3.2 Model 2

We have included a second model keeping the dependent variable and all control variables the same as in Model 1. However, we have changed the independent variable to measure the effect of league choice on market value change in a different way. The OLS regression is:

$$ln\Delta MV = \alpha + \beta_1 T1 + \Sigma Player\ controls + \varepsilon$$

where T1 is our independent variable, measuring the effect of joining either a T1 or T2 league has on the players' market value.

3.3.2 Model 3

For further robustness we have included a third model keeping the dependent and control variables the same. We have again substituted the independent variable to measure if joining a T1 league and being loaned out from that club influences market value change compared to joining a T1 league and not being loaned out or joining a T2 league. The OLS regression is:

$$ln\Delta MV = \alpha + \beta_1 T1LOAN + \Sigma Player\ controls + \varepsilon$$

where T1LOAN is our independent variable as described in Section 3.2.3.

3.3.3 Statistical concerns

Though we have structured our models to resemble a hedonic pricing technique, the method applied to our study is an OLS regression which relies on the assumption of homoscedastic data. This assumption holds if the variance of the error terms is consistent across all independent variables. To test this assumption, we used a Breusch-Pagan test, which observes the issue of heteroscedasticity (Appendix Table 15). If the variance of the error terms is not consistent for all observations, the test will indicate presence of heteroscedasticity. In this case, we apply robust standard errors to deal with the heteroscedasticity issue since the estimates provided become less sensitive to violations of the assumption of homoscedasticity.

To control and handle the issue of multicollinearity, we used a variance inflation factor analysis (VIF) to determine if any of the independent variables were highly correlated with each other (Appendix Table 14). If the VIF score is too high we run the regression again, omitting one of the highly correlated variables. However, some variables are expected to be highly correlated and therefore a high VIF score does not automatically remove them from the regression without consideration.

In models 1 and 3 there is a potential subsampling issue. Model 1 filters away many of our 336 observations due to how the model is set up. It creates an uneven distribution of the two groups measured against each other, where one group consists of 23 observations and the other of 154 observations. This could potentially distort the results and must be considered when discussing the results of the model. Model 3 experiences a similar issue, however it still includes all the 336 observations. Due to how the independent variable is constructed, there is

again an uneven distribution with one group consisting of 81 observations and the other of 255 observations. Again, this must be considered when analyzing the results of the model.

4. Results

4.1 Descriptive statistics

Table 2 shows the descriptive statistics for all players making their first international move to a T1 league. We see that we have 153 observations in this category, and something important to note is that the coefficient for the mean change in market value is negative with a median of zero. Thus, players moving to T1 leagues from other countries in Europe has a tendency to lose market value implying that they find it hard to perform at this incredibly high level for their first international transfer. Table 3 then shows the split in footedness between the T1 players as well as their presence in the national team. From this table, the biggest point of interest is that a clear majority of the players moving to T1 leagues have also played for their national team, implying either that this kind of experience increases the chance of making clubs from the absolute top leagues interested, or perhaps more likely, that playing in a T1 league increases the chances of playing for your national team.

Table 4 shows the descriptive statistics for the T2 players. We have 183 observations, slightly more than for T1, but a small enough gap to claim that they are evenly distributed. The mean market value change is still negative, implying that it is hard to succeed overall for a first international transfer, and that the difference between T1 and T2 in this sense is not clearly noticeable. The average age is slightly higher for the T2 players than T1, but it is still relatively low, which may explain the average success rate in terms of market value development, as the players are still young and thus somewhat inexperienced. There is a rather large gap in average minutes played for the T2 players compared to the T1 players, however, the duration is also shorter by almost a year, meaning that the T2 players play more minutes per year, but stay at their first club outside of their home country for a shorter time. Another interesting difference is seen in Table 5 where a much smaller share of the T2 players have played for the national team. As all players in the total sample have moved to a higher ranked league than their home league, it implies that it is rather the effect of playing for your national team that increases the interest of the clubs in the T1 leagues than the movement to a higher ranked league that increases your chances to play for your national team. This is

however only theorizing, and we will see in our models what effect presence in your national team has on your market value development.

Table 6-9 includes the descriptive statistics, as well as footedness and national team presence for our subsamples, first the players with T2 experience moving to T1, and then the T1 players that have been loaned out during their spell at a club in a T1 league.

Table 2 descriptive statistics market values and performance statistics T1

Variables	N	Min	P25	Median	P75	Max	SD	Mean
Initial MV (€)	153	50,000	850,000	1,900,000	4,000,000	24,000,000	4,090,207	3,237,418
Next MV (€)	153	50,000	750,000	1,800,000	5,000,000	70,000,000	8,108,011	4,455,229
lnΔMV	153	-4.25	-0.69	0.00	0.44	2.36	1.08	-0.12
Age	153	16.00	19.00	21.00	24.00	32.00	3.08	21.69
Goals	153	0.00	3.00	9.00	16.50	103.00	14.87	12.92
Assists	153	0.00	1.00	5.00	10.00	55.00	8.54	7.02
Yellow cards	153	0.00	1.00	4.00	9.00	33.00	6.61	6.14
Red cards	153	0.00	0.00	0.00	0.00	3.00	0.54	0.22
Minutes played	153	0.00	1,183.50	2,801.00	4,426.50	17,490.00	3,363.73	3,524.70
Duration (years)	153	0.08	1.37	2.43	3.44	9.09	1.79	2.65

Table 3 descriptive statistics footedness and national team presence T1

Foot	N
Right	106
Left	33
Both	14
National Team	N
Yes	120
No	33

Table 4 descriptive statistics market values and performance statistics T2

Variables	N	Min	P25	Median	P75	Max	SD	Mean
Initial MV (€)	183	25,000	350,000	700,000	1,500,000	12,000,000	1,535,543	1,222,814
Next MV (€)	183	150,000	350,000	700,000	1,800,000	24,000,000	3,023,200	1,730,328
lnΔMV	183	-4.61	-0.41	0.00	0.34	1.61	0.88	-0.16
Age	183	17.00	20.00	22.00	24.00	33.00	2.85	22.33
Goals	183	0.00	2.00	6.00	13.00	79.00	11.20	9.07
Assists	183	0.00	1.00	3.00	7.00	33.00	6.26	5.02
Yellow cards	183	0.00	1.00	3.00	6.00	33.00	5.31	4.39
Red cards	183	0.00	0.00	0.00	0.00	3.00	0.49	0.17
Minutes played	183	0.00	743.00	2,022.00	3,685.00	14,768.00	2,494.93	2,596.26
Duration (years)	183	0.21	1.00	1.75	2.50	5.86	1.08	1.86

Table 5 descriptive statistics footedness and national team presence T2

Foot	N
Right	133
Left	39
Both	11
National Team	**N**
Yes	107
No	76

Table 6 descriptive statistics market values and performance statistics T2EXP

Variables	N	Min	P25	Median	P75	Max	SD	Mean
Initial MV (€)	22	600,000	1,575,000	4,750,000	8,250,000	18,000,000	4,224,838	5,427,273
Next MV (€)	22	400,000	1,725,000	4,000,000	6,250,000	27,000,000	6,459,501	5,929,545
lnΔMV	22	-1.67	-0.61	-0.16	0.53	2.30	0.89	-0.01
Age	22	20.00	21.75	23.50	25.00	29.00	2.35	23.59
Goals	22	0.00	5.00	16.00	27.50	62.00	14.89	18.05
Assists	22	0.00	4.00	7.50	12.25	28.00	6.76	8.77
Yellow cards	22	0.00	3.75	5.00	11.00	27.00	6.01	7.32
Red cards	22	0.00	0.00	0.00	1.00	5.00	1.18	0.59
Minutes played	22	199.00	2,134.75	5,040.00	6,481.50	12,121.00	2,800.46	4,652.27
Duration (years)	22	0.49	1.86	2.64	3.22	5.53	1.17	2.69

Table 7 descriptive statistics footedness and national team presence T2EXP

Foot	N
Right	18
Left	3
Both	1
National Team	N
Yes	21
No	1

Table 8 descriptive statistics market values and performance statistics T1LOAN

Variables	N	Min	P25	Median	P75	Max	SD	Mean
Initial MV (€)	81	50,000	650,000	1,250,000	3,000,000	24,000,000	3,866,545	2,586,728
Next MV (€)	81	50,000	600,000	1,000,000	2,900,000	15,000,000	2,728,906	2,345,679
lnΔMV	81	-4.03	-0.69	0.15	0.59	2.36	1.15	-0.04
Age	81	16.00	19.00	20.00	22.00	29.00	2.56	20.58
Goals	81	0.00	4.00	9.00	15.00	52.00	11.23	12.28
Assists	81	0.00	2.00	5.00	8.00	55.00	9.09	7.31
Yellow cards	81	0.00	2.00	5.00	10.00	33.00	6.53	6.75
Red cards	81	0.00	0.00	0.00	0.00	2.00	0.49	0.20
Minutes played	81	0.00	1,527.00	2,901.00	3,908.00	17,490.00	3,049.12	3,465.65
Duration (years)	81	0.84	1.98	2.65	3.49	9.09	1.69	3.04

Table 9 descriptive statistics footedness and national team presence T1LOAN

Foot	N
Right	58
Left	15
§Both	8
National Team	N
Yes	60
No	21

4.2 Results Model 1

Table 10 Results Model 1

Variable	Coef.	SE	t-value	P>|t|	Sig.
Intercept	8.123	3.941	2.060	0.041	**
T2EXP	-0.190	0.193	-0.980	0.326	
Age	-0.623	0.350	-1.780	0.077	*
Age squared	0.011	0.008	1.490	0.139	
National team	0.348	0.183	1.900	0.059	*
Duration	-0.284	0.089	-3.190	0.002	***
Foot	-0.008	0.114	-0.070	0.942	
Goals	0.021	0.009	2.290	0.023	**
Assists	-0.020	0.019	-1.100	0.272	
Yellow cards	-0.005	0.018	-0.280	0.780	
Red cards	0.018	0.123	0.150	0.885	
Minutes	0.000	0.000	2.190	0.030	**
R squared	0.272	Root MSE	0.934	F-statistic	5.550
Adj R Squared	0.223	df	162	p-value	0.000

Our first model only includes players who have joined a T1 league for their first or second international transfer, and the descriptive statistics in Table 1 are thus representative of this model. We have an R squared of 0.272 meaning that 27.2% of the variance in players' market value changes are explained by the model. Here, we test whether a player maximizes his market value through moving to a T1 league instantly, or if it is better to take a middle step in a T2 league before. The results from this show that the effect of a T2 move before a move to T1 is negative in terms of market value development, however it is not statistically significant. This means that for hypothesis 1, we fail to reject the null hypothesis (H_0), and can thus not reject that there is not a significant effect on the change in football players' market value development depending on if they join a top 5 league for their first international transfer rather than moving to a top 6-10 league first and then joining the top 5. Rather, it seems that the duration in the first club a player joins, as well as performance statistics such as goals and minutes, and presence in the national team are the main positive drivers of footballer valuation development. We also see significance in the age of a player, which is

negative. However, as we only had 23 observations in our sample who had made a move from T2 to T1, the result is not statistically powerful.

4.3 Results Model 2

Table 11 Results Model 2

Variable	Coef.	SE	t-value	P>|t|	Sig.
Intercept	7.219	2.455	2.940	0.004	***
T1	-0.075	0.092	-0.820	0.411	
Age	-0.519	0.211	-2.450	0.015	**
Age squared	0.009	0.004	2.050	0.041	**
National team	0.012	0.095	0.130	0.898	
Duration	-0.335	0.069	-4.890	0.000	***
Foot	-0.044	0.071	-0.620	0.532	
Goals	0.023	0.008	2.750	0.006	***
Assists	-0.010	0.016	-0.610	0.541	
Yellow cards	-0.015	0.015	-1.020	0.306	
Red cards	0.039	0.118	0.330	0.743	
Minutes	0.000	0.000	3.110	0.002	***
R squared	0.327	Root MSE	0.815	F-statistic	10.170
Adj R Squared	0.304	df	324	p-value	0.000

Our second model includes the entire sample. To begin with, we have an increased R squared of 0.331 which is reasonable considering a larger and more evenly distributed sample size usually increases the statistical power of the regression. The T1 variable is negative and non-significant, meaning that we for hypothesis 2 once again fail to reject the null hypothesis that there is not a significant effect on the change in football players' market values development depending on the choice of league tier (top 5 vs. top 6-10) for their first international transfer. Here, the goals and minutes have increased in significance to the 1% level, further implying that they are among the most relevant value drivers along with duration. National team presence is no longer significant; however, age has increased in significance and age squared is now also significant.

4.4 Results Model 3

Table 12 Results Model 3

Variable	Coef.	SE	t-value	P>|t|	Sig.
Intercept	7.265	2.451	2.960	0.003	***
T1LOAN	-0.105	0.127	-0.830	0.409	
Age	-0.521	0.211	-2.470	0.014	**
Age squared	0.009	0.004	2.050	0.041	**
National team	0.006	0.094	0.060	0.952	
Duration	-0.329	0.069	-4.790	0.000	***
Foot	-0.046	0.070	-0.660	0.513	
Goals	0.023	0.008	2.730	0.007	***
Assists	-0.009	0.016	-0.550	0.583	
Yellow cards	-0.014	0.015	-0.960	0.340	
Red cards	0.036	0.118	0.300	0.761	
Minutes	0.000	0.000	2.990	0.003	***
R squared	0.328	Root MSE	0.815	F-statistic	10.210
Adj R Squared	0.305	df	324	p-value	0.000

Model 3 once again includes the entire sample and compares the effect of moving to a T1 league and then being loaned out, to staying at the T1 league or moving to a T2 league regardless of staying or being loaned out. The results are very similar to model 2 where the same variables (age, age squared, duration, goals, and minutes) are statistically significant which is expected as the only variable that has changed is the difference of moving to T1 and being loaned out rather than moving to T1 in general. As T1LOAN is not statistically significant, we fail to reject the null hypothesis, that there is not a significant effect on the change in football players' market values from joining a top 5 league for their first international transfer and being loaned out rather than staying in the top 5 league or moving to a T2 league instead of T1, for hypothesis 3 as well.

5. Analysis and discussion

Model 1

The results from the first model do not support our hypothesis that which league a player joins when making an international transfer has a significant impact on the market value development of the player. As described in Section 3, model 1 measures the impact of league choice by observing if there is a benefit of first joining a T2 league before joining a T1 league. It is important to consider that the sample for this model only have 23 observations who have experience from a T2 league and later moved to a T1 league. The number of observations who moved directly to a T1 league is 154, making the sample uneven and relatively small. However, while being careful in drawing conclusions, the result can give an indication of how the variables impact market value change. We observe that performance-related statistics are what significantly drive the market value of a football player. In line with earlier research, goals scored, and minutes played are statistically significant at the 5% level with positive coefficients, further strengthening earlier conclusions that performing well and playing a lot will be the most valuable attribute of a football player. Thus, we contribute to earlier research by finding similar results for players outside of the top 5 leagues and that does not come from the top ranked countries in football. Interestingly, age is significant at the 10% level in this model and age-squared is not significant, which matches with a few models used in earlier research, but differs from the general consensus (Franceschi et al., 2024). This is most likely due to the small subsample used in this model and the age variables being sensitive to the sample structure. National team status is also significant in line with earlier findings, implying that it adds value to represent one's national team, even though none of our players come from the largest football countries nor from a country who has won the FIFA World Cup (FIFA. (n.d.). FIFA World Cup champions: 1930–1978; FIFA. (n.d.). FIFA World Cup champions: 1982–2022). Based on this model, this implies that there is little difference in what level a national team is at, it is always value adding to represent it.

Another interesting result from our model is the duration variable being significant at the 1% level with a negative coefficient. This result also relates back to the theory of job mobility and indicates that staying at a club for a longer period of time will have a negative impact on a player's market value. For a player to maximize his market value growth, he should based on these results perform well and play many minutes, but also not stay at his new club for long. In accordance with job mobility theory, which states that job mobility and contract duration

are significant and positive wage growth drivers, players should minimize their tenure at a club if their primary concern is to increase their market value (Amuedo-Dorantes et al., 2007).

However, since the subsample has made the observations more homogenous compared to the complete dataset which will be used in the following models, there is a risk that factors and variables which otherwise are insignificant can become differentiators and explain positive or negative effects in market value changes. We therefore remain careful in drawing final conclusions from this model.

Model 2

Our findings in model 2 do not provide support for our hypothesis that choosing to join a T1 or T2 league when making an international transfer has a significant impact on the players' market value development either. From Model 1 we keep the observation that performance-related statistics significantly drive the market value of a football player. In this model, goals scored, and minutes played are even more significant and considering that this model includes a larger and less homogenous sample with a more even split between T1 and T2 players, its results are more reliable. While it may seem contradicting that both minutes and goals are this significant, as other have found that goals and other kinds of performance should be captured by the minutes that players get, the coefficient for minutes is below one permille, indicating that it may not impact value change much despite its significance. Granted, there are a few influential observations included in our sample as can be seen from the Cook's distance test (Appendix Figure 1). We have chosen not to remove these observations when running the regression since the football player market is characterized by individual characteristics and volatility. Now, both Age and Age-squared are significant at the 5% level, however their coefficients are quite counterintuitive. When only including the age variable in our model, we observe a negative coefficient statistically significant at the 1% level, which means that a player's value decreases linearly over time. However, player age and market value are not assumed to be a linear relationship. Thus, we would expect the age variable to have a positive coefficient and the age-squared variable to have a negative coefficient, resulting in a reversed u-shape relationship between age and market value development. From our model we observe the opposite which indicates that there is a U-shaped age to market value relationship, meaning that a young player's market value decreases until a certain age and then it starts to increase again. This result is very rare, however it has appeared before (Franceschi et al., 2024) and is likely due to our data only capturing the market value change over an average

period of 2.22 years (Section 4.1), the duration between a player joining and leaving a T1 or T2 club. The time frame being this short means that temporary market value changes are being captured rather than long-term career trajectories. Therefore, positive market value changes among older players (or negative changes for young players) rather reflect short-term spikes due to other factors such as performance. Relating this to the theory of job mobility, it makes sense that a player making his first international move to a T1 or T2 league when he is older generally performs better than a young inexperienced player. Job mobility and typecasting theory states that employers will favor candidates who have showcased the wanted attributes in similar positions previously (Zuckerman et al., 2003), and job history data can provide these signals to employers (Bills, 1990). For a T1 or T2 club to sign an older player, one must assume that the player has displayed the attributes demanded, and the signing club has a lot of information to base their decision on due to the older players' experience. This makes the signing of an older player less of a risk compared to signing a young player with little experience, and consequently a higher chance of short-term exceptional performance which increases the market value of the old player. Another possible explanation for this result is that players who stay in their home league for a longer time are likely those who have been unable to prove their talent and ability at a very young age, meaning that their market value has been very low the years preceding the transfer, and a spike in performance just a few years before their transfer may not have been enough to boost their market value to the correct level.

The fact that the national team variable is no longer significant should imply that our sample used in model 1 is not representative. However, another possible explanation is that it actually does matter what level that a national team plays at, as the significance vanishes when the sample of players from countries of lesser international status and track records grows, implying that as there is less competition to play for these countries, it is not as meritorious. The significance of national team status varies a lot in earlier research, however based on a subsample in the systematic review on football player valuation research by Franceschi et al. (2023), results like ours are common.

Model 3

Consistent with models 1 and 2, the third model also indicates that the market value change in a player is not affected by which league he chooses to join, not even when loan moves are considered. The third model is another way of measuring the impact of league choice on

player market value and it observes if moving to a T1 league and being loaned out while at that club significantly impacts the market value. Again, we conclude that performance-related variables and age are what drives the market value change. The significance levels are the same as in Model 2 and follow the same theoretical reasoning.

Non-significant results

Our primary goal with our models was to observe if the league a player chooses to join has an impact on how the market value of the player changes when making his subsequent move. This was captured by the T1 variable in model 1, T2EXP variable in Model 2, and T1LOANEDOUT in model 3. Neither of these variables were statistically significant, indicating that the league a player joins when making his first international transfer does not influence his market value when making his next transfer, regardless of whether a player moves to a T1 league instantly or through a T2 league, whether a player moves to T1 or T2 disregarding where they make their next move, or if a player moves to a T1 league and joins another league on loan as opposed to staying or moving to T2. This further supports the idea that which league a player decides to play in will not have an effect on how his market value changes during his stay at the club. Previous research has concluded that there is a positive effect on a player's market value when he makes a move to a better club. However, it is noteworthy that except for a few cases, a club in a top 10 league is always a step up from the smaller leagues, meaning that rather than contradicting earlier results, we can add to the theory that the degree of upwards movement is less relevant than the fact that the movement is actually upwards. Our results indicate that which club or league in the top 10 that you join does not have an effect on how the market value changes when playing at that club. Thus, it seems as if there is no or merely a small difference in the developmental environment at the various clubs included in the T1 and T2 leagues. Therefore, based on our results when a player makes his first international transfer, he should not consider whether it is better to first join a T2 league or a T1 league, since the only factors which will increase his market value are performance related.

Validity of our results

There are a few risks to consider before drawing too strong conclusions from our results. Omitted variable bias is a common risk which should be mentioned and could skew the results in our models. However, we deem this risk to be relatively low since several control variables are included in all models, based on a significant amount of previous research. Then there is

the subsampling issue in models 1 and 3. The subsampling resulted in our independent variable being distributed in two uneven groups. Especially in Model 1 this is an issue since the complete sample size is smaller as well, and this could affect the results in the model. Nevertheless, we can use the model as an indicator of the significance level of the independent variable and the direction of the coefficient.

6. Conclusion

6.1 Contributions

In this study, we looked at the effect that the league choice that a European striker makes for his first international transfer will have on his future market value, and what choices that should be made to maximize this value. We used the market value from TM at the time of this transfer as our starting point and looked at the difference between this market value and the second time point which was at the time when the player made his subsequent transfer (or alternatively two years, approximately the average duration of our sample, after the initial move, or the latest updated value on the date 2025-04-23 when the data was collected to increase our sample). We used three models to test this, one that compared all players moving directly to a T1 league with players who first went to a T2 league and then moved to T1 in their subsequent transfer, one that just compared moving to a T1 or a T2 league for the first transfer, and one that looked at players moving to a T1 league and being loaned out compared to the rest of the sample. From these models we can conclude that the league choices of players essentially are irrelevant for the development of market values, as all our independent variables of interest were insignificant. Thus, we can conclude that this variable is not something that is worth looking deeper into, at least for European strikers.

Another important contribution made by this study is the broadening of leagues included, which means that players that are not usually included in studies that try to value football players are now represented. We have also excluded players from countries that are the home base for a top 10 league, meaning that a large portion of the players that are usually included in the studies that rarely move outside the top 5 leagues will not influence our results. Thus, the similarity between the results from our study and the value drivers that earlier research has found is not due to our sample including mostly the same players, and thus implies that these earlier findings are general for male football players, and not exclusive for the absolute elite football players. We found that age, age squared, goals scored, minutes played, and duration

are the statistically significant value drivers (national team was also significant in one model, but only when a very skewed sample was used and is thus excluded) which summarizes different findings in earlier research rather well, and while we do not reach exactly the same results as any other study, the similar findings should not be overlooked when discussing issues with the generality of earlier findings.

6.2 Limitations

Although there are conclusions to be drawn from our study, there are limitations to it as well. Firstly, we have limited our sample selection to increase controllability and to create a more homogenous dataset. This can however lead to a sample selection bias since we leave out players who have not made a move into a T1 or T2 league, and we only test the effect for players in the striker position. The sample selection bias limits our ability to generalize our results. Secondly, our study uses market values from TM as a proxy, but one must remember that these are estimates and not based on real transactions. Our uneven sample sizes in Models 1 and 3 also limits our generalizability. The imbalance between the groups of comparison can have a distorting effect on statistical power and it also makes the groups less comparable. Further, as is a common limitation in football player valuation, omitted variable bias is a significant limitation to our models. We have included what earlier research concluded are significant value drivers in our models, but there is always a risk that relevant variables have been left out of the model. Lastly, there are limitations related to specificity in some of our variables included in the models. The national team variable is included as a binary variable, not differing between players who have made one single appearance and a player who have played national team football their whole professional career. Our grouping of T1 and T2 leagues could also be further specified, adding a variable for each league to observe if there are more incremental differences rather than grouping them together. Since the study is conducted in exclusively a European context, applying the results to a context outside of Europe will likely not be valid due to geographical football market differences.

6.3 Future research

For future research, our suggestions are based on what we have found in our study and the limitations of it. There is always an opportunity to include more detailed player performance statistics to create a more nuanced model which potentially explains more of the factors

driving player market values. Another opportunity is to separate our T1 and T2 groups and measure the effect each specific league has on market value change. Examining the league factor at a more detailed level will add a new dimension and be directly comparable to our results. The study could be conducted with a less restricted sample, including players moving into T1 or T2 leagues from outside Europe. One could also include players from all positions and add a position variable to the model to control for its effect. Including variables not related to player performance but to media visibility could potentially enhance the statistical power of the models since it has been proven to be a significant market value driver. An additional aspect that could be considered in future research is the value drivers of women's football. At this date, the data may be very limited, however with the worldwide growth of women's football it is reasonable to assume that more and more data will become available in the coming years which opens up possibilities to compare the value drivers in the women's game to those of the men's, which will not only bring new insights but further strengthen or weaken the generality of conclusions that have been drawn so far for the men's game.

7. References

Amuedo-Dorantes, C., & Serrano-Padial, R. (2007). Wage Growth Implications of Fixed-Term Employment: An Analysis by Contract Duration and Job Mobility. *Labour Economics*. Volume 14, Issue 5. Pages 829-847. ISSN 0927-5371.

Bills, D. B. (1990). Employers' Use of Job History Data for Making Hiring Decisions: A Fuller Specification of Job Assignment and Status Attainment. *The Sociological Quarterly*, 31(1), 23–35.

Binder, J. J., & Findlay, M. (2016). The Effects of the Bosman Ruling on National and Club Teams in Europe. *Journal of Sports Economics*, 13(2), 107-129.

Brummet, R. L., Flamholtz, E. G., & Pyle, W. C. (1968). Human resource measurement – a challenge for accountants. *The accounting review*.

Carmichael, F., & Thomas, D. (1993). Bargaining in the transfer market: theory and evidence. *Applied Economics*, *25*(12), 1467.

Court, A.T. (1939) Hedonic Price Indexes. *The Dynamics of Automobile Demand*, 99-119. General Motors Corporation.

FIFA. (n.d.). *FIFA World Cup champions: 1930–1978*. https://www.fifa.com/en/tournaments/mens/worldcup/articles/world-cup-champions-1930-1978-uruguay-italy-germany-brazil-england-argentina Accessed 2025-05-03.

FIFA. (n.d.). *FIFA World Cup champions: 1982–2022*. https://www.fifa.com/en/articles/world-cup-champions-1982-2022-italy-argentina-germany-brazil-france-spain Accessed 2025-05-03.

Franceschi, M., Brocard, J.-F., Follert, F., & Gouguet, J.-J. (2024). Determinants of football players' valuation: a systematic review. *Journal of Economic Surveys*, 38, 577–600.

Franck, E., & Nüesch, S. (2008). Mechanisms of Superstar Formation in German Soccer: Empirical Evidence. *European Sport Management Quarterly*, 8(2), 145–164.

García-del-Barrio, P., & Pujol, F. (2020). Recruiting talent in a global sports market: Appraisals of soccer players' transfer fees. *Managerial Finance*. 47 (6), 2020, 789 – 811

Gazzola, P., Amelio, S., Fragkoulis Papagiannis, F., Vătămănescu, E.-M. (2019). Financial Reporting in European Football Teams: A Disclosure Analysis of Player Registrations. *International Journal of Academic Research in Accounting, Finance and Management Sciences* 9 (4): 182-206

Gerrard, B. (2001). A new approach to measuring player and team quality in professional team sports. *European Sport Management Quarterly*, *1*(3), 219–234.

He, M., Cachucho, R., & Knobbe, A. (2015). Football player's performance and market value. *Proceedings of the 2nd Workshop of Sports Analytics, European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases* (ECML PKDD).

Herm, S., Callsen-Bracker, H.-M., & Kreis, H. (2014). When the crowd evaluates soccer players' market values: Accuracy and evaluation attributes of an online community, *Sport Management Review*, Volume 17, Issue 4, 2014, Pages 484-492, ISSN 1441-3523.

Hughes, M., Caudrelier, T., James, N., Redwood-Brown, A., Donnelly, I., Kirkbride, A., & Duschesne, C., (2012) "Moneyball and soccer-an analysis of the key performance indicators of elite male soccer players by position". *Universidad de Alicante. Area de ´ Educaci´on F´ısica y Deporte*.

Hull, J. C. (2012). *Options, futures, and other derivatives* (8th ed.). Pearson Education. (p.15, 101, 103-104, 121, 257, 281).

Monson, M. (2009). "Valuation Using Hedonic Pricing Models". *Cornell Real Estate Review*.

Müller, O., Simons, A., & Weinmann, M. (2017). Beyond crowd judgments: Data-driven estimation of market value in association football. *European Journal of Operational Research*, 263, 611–624.

Ng, T. W. H., Sorensen, K. L., Eby, L. T., & Feldman, D. C. (2007). Determinants of job mobility: A theoretical integration and extension. *Journal of Occupational & Organizational Psychology*, 80(3), 363–386.

Poli, R., Besson, R., & Ravenel, L. (2022). Econometric Approach to Assessing the Transfer Fees and Values of Professional Football Players. *Economies*, 10, 4.

Poli, R., Ravenel, L., & Besson, R. (2024). Global economic analysis of the transfer market (2015-2024). *CIES Football Observatory*.

Prockl, F., & Frick, B. (2018). Information precision in online communities: Player valuations on www.transfermarkt.de. *International Journal of Sport Finance,* 13(4), 319-335.

Rosen, S. (1974). Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition. *Journal of Political Economy*, 82(1), 34–55.

Serna Rodríguez, M., Ramírez Hassan, A., & Coad, A. (2019). Uncovering Value Drivers of High Performance Soccer Players. *Journal of Sports Economics*, 20(6), 819-849.

Sopranzetti, B. J. (2015). Hedonic regression models. *Handbook of Financial Econometrics and Statistics*, 2119-2134.

Toma, S.G., & Catana S. (2021) The value of brand in the football industry. *Analele Universităţii Constantin Brâncuşi din Târgu Jiu : Seria Economie*, Vol.1, p.27-31.

UEFA. *Men's Association Club Coefficients Ranking – UEFA Rankings 2023/2024*. https://www.uefa.com/nationalassociations/uefarankings/country/?year=2024 Accessed 2025-01-29.

Velema, T. A. (2019). Upward and downward job mobility and player market values in contemporary European professional football. *Sport Management Review*, 22(2), 209–221.

Zuckerman, E. W., Kim, T., Ukanwa, K., & von Rittmann, J. (2003). Robust Identities or Nonentities? Typecasting in the Feature-Film Labor Market. *American Journal of Sociology*, 108(5), 1018–1074.

8. Appendix

Table 13 Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11
(1) T1	1.00										
(2) Age	-0.11	1.00									
(3) Age squared	-0.10	1.00	1.00								
(4) National team	0.21	0.14	0.14	1.00							
(5) Duration	0.26	-0.20	-0.20	0.16	1.00						
(6) Foot	0.05	0.01	0.01	-0.04	-0.04	1.00					
(7) Goals	0.15	-0.08	-0.08	0.30	0.55	-0.05	1.00				
(8) Assists	0.13	-0.03	-0.04	0.31	0.59	0.01	0.67	1.00			
(9) Yellow cards	0.15	0.02	0.02	0.28	0.57	-0.04	0.62	0.64	1.00		
(10) Red cards	0.04	0.00	0.00	0.21	0.33	-0.02	0.40	0.36	0.50	1.00	
(11) Minutes	0.16	-0.04	-0.04	0.31	0.73	-0.03	0.83	0.85	0.75	0.44	1.00

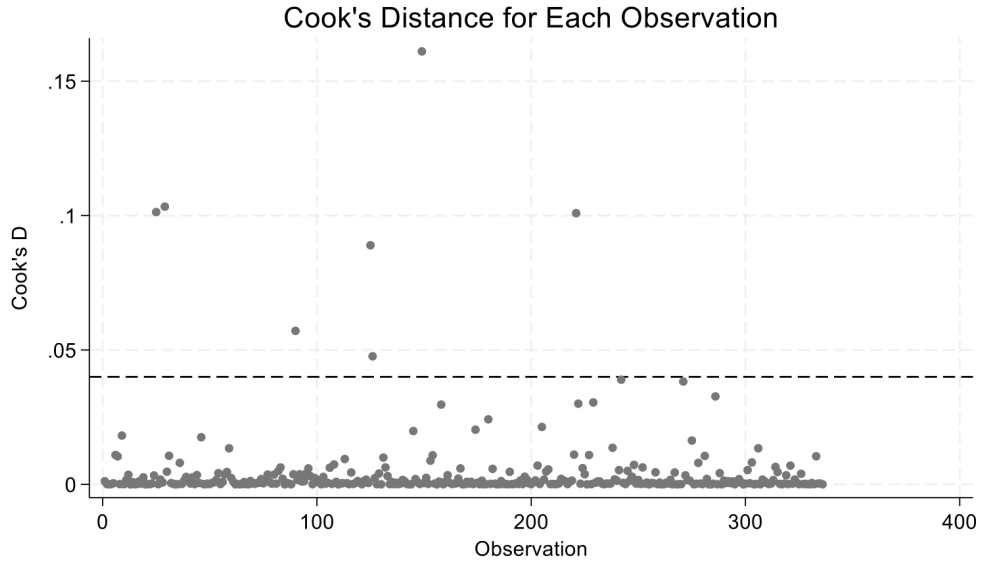
Table 14 Variance Inflation Factor (VIF)

Variable	VIF
Age	146.63
Age squared	145.57
Minutes	11.18
Assists	3.94
Goals	3.56
Duration	2.65
Yellow cards	2.54
Red cards	1.36
National team	1.22
T1	1.15
Foot	1.02
Mean VIF	29.17

Table 15 Breusch-Pagan Test

Chi-square	26.66
Prob>Chi-square	0.000

Figure 1 Cook's Distance



AI disclosure

- **Which AI tools were used when writing the thesis and what was the purpose?**
  We only used one AI tool when writing our thesis, ChatGPT. It was only used in the data collection process as a tool to trouble shoot code written in Python.
- **How has the use of AI increased the quality of the thesis?**
  The use of ChatGPT when writing code in Python helped us to collect a larger amount of data more quickly. We could move on from the data collection process at an earlier stage and spend more time on modelling and analysis.
- **What risks were identified when using AI and how were they mitigated?**
  Since we only used ChatGPT in our data collection process by trouble shooting code, the risks were quite low. We manually checked all observations which we gathered with our code to ensure that they had been correctly chosen. Thus, there was essentially no risk when using the AI tool the way we did.
- **What insights were gained regarding the use of AI in the thesis writing process?**
  The use of AI makes collecting large amounts of data more efficient and enables you to put more focus on analysis rather than trying to figure out how to correct faulty code.