

**ANALYSIS OF VARIABLES WHICH DETERMINE FOOTBALL
PLAYERS' MARKET VALUE**

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Date: 05/13/2015

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Research Question

I would like to investigate transfer fees for European football (soccer) players. Because I am an avid fan of Chelsea Football Club and the English Premiere League, I wanted to focus my study on players being transferred in and out of the English Premiere League. The Premiere league is the best league in the United Kingdom and it is considered to be the most competitive leagues in the world by football analysts, managers and fans. Due to the high level of competition in the league, so many players from all over the world dream of playing for a Premiere League team. After the world record transfer fee has been broken twice in the last 5 years by players in The Premiere league, I wanted to investigate the determinants of a players transfer fee. What is the motivation that drives teams like Chelsea FC and Real Madrid to spending €60 million and €91 million respectively for players' services? Is it the number of games a player has played for his club or the number of goals and assists he racks up that determine how much he will be sold for? I would also like to investigate if there is a premium associated with the position a footballer plays on the pitch. My research question is what are the determinants of the transfer fee (value) of a football player?

Literature Review

Unlike many American sports such as American football, baseball and basketball, there are very few economic studies available about soccer. This is probably because soccer is less popular than football, basketball and baseball at the college and professional level in the United States and also because there are very few databases where researchers can obtain player statistics to work with. Although statistics for soccer players are very limited, there have been a few empirical studies with the purpose of determining the transfer fee of a soccer player.

Urrutia Ignacio and Angel Barajas (2009) from IESE Business School in Spain attempted to create a model for the transfer fees of soccer players using transfer data from 2001 to 2006. They looked at all 216 transfers that took place over those five years and although they had a low R^2 of about .26 after insignificant variables were removed, they were able to determine that the age of a soccer player, the position of the buying club in the previous season and international goals the player scored were significant and therefore important in determining the transfer fee of a soccer player (Ignacio and Barajas 2009). They also looked at variables like the number of seasons a player has spent in professional football which represent the experience of that player and the number of career goals and assists but in the end, these variables were removed from their model because they were found to be insignificant. The model they developed was not very useful because if a player is valued at above €10 million, other variables such as classification of a player as homegrown, promising and international star had to be added to the model to keep it accurate.

Inspired by record breaking transfer fees of Kaka and Cristiano Ronaldo to Real Madrid FC, Michael Chan decided to investigate the determinants of a player's transfer value in 2009. Michael Chan came up with 9 factors he believes are crucial to the value of a footballer. One of the most important ones was the age of the player. He found that older players between the ages of 30 to 35 were very inexpensive regardless of how well they are performing because they are coming to the end of their careers. He also pointed out that teams buying players in this age range are making short-term investments for immediate performance as oppose to teams buying players in the 18 to 25 age group who are making long-term investment based on the potential of the player. Another variable he found significant was talent, a subjective measure he constructed. He divided players into 4 categories: top 10 percentile, top 25 percentile, top 40 percentile and

top 60 percentile in their respective positions. He discovered that there is a premium for players in the attacking midfield positions and the adaptability of a player to different positions on the pitch.

Iconic status was another interesting variable Michael Chan selected as an important determinant of a player's transfer fee. Players like Ronaldo, Rooney, Gerrard, Neymar, Messi and Bale are all iconic players meaning not only are they elite players, but they are well-known all around the world and having these players at a particular club will not only boost performance because of their playing abilities but it will boost a club's popularity and increase jersey sales for the club. This variable is also subjective because there is no definite way of determining an iconic player.

Chan also pointed out that the squad status of a player (calculated from the number of minutes he plays per season) is also important in determining the value of a player. If a player has a very high squad status, the club that owns the player will most likely not sell him at his market value just because of how valuable he is to the team's revenues. The buying team will have to put in a premium to give the selling team an incentive to separate from an important player.

In a 2013 study, Yuan He discovered a couple of very important correlations between a player value and couple of the independent variables I will be using in my model. Yuan He did not use actual transfer fees; instead he used player values computed by a reliable German football statistics website, Transfer Markt. This website assigns values to players based on past performance and the current form of a player. It also shows a graph of the value of a certain player over his playing career including all the times the player was transferred.

Yuan He analyzed 350 players using the market value from the website and made some interesting discoveries. He discovered that strikers (the goal scorers in a team) had the highest premiums followed closely by midfielders (the goal creators in a team) and defenders, and goalkeepers were the least expensive. An interesting variable used in this study was the level of the national team for which a certain player play and players playing in the best national team tended to be more expensive than those playing for poor or average national teams. Yuan also graphed the age of players against their transfer values and found a normal distribution with value on the y axis and age on the x. He found that the most expensive players were between the ages of 24 and 28 with players under 24 and over 28 years old to be less expensive. This is not surprising because soccer players reach their prime between the age of 24 and 28 and they tend to stay at their prime until 30 unless plagued by injuries. So it makes sense that younger players were less expensive because they lacked experience and older players were also less expensive because they have reached and or surpassed their primes.

In a study conducted by Fernando Barrera Rey for Frontier Economics, the effects on player transfer fees of statistics such as goals scored, goals conceded, minutes played, Ballon D'Or nominations (trophy awarded to the best player in the world), and calls to the national team were measured. Fernando Rey made some significant discoveries; for example, a player getting more club playing time is more important than that player getting a call up for the national team. A player playing 90 minutes (the full length of a soccer game) added about 3.2% to that player's value (Rey 2009).

This study also found that different variables such as goals scored and minutes played have different weights depending on the position of a player. For example a goal scored adds 3.4% to a striker's value while it does not change the valuation of a defender. This is because

different players on a soccer field have different responsibilities, a forward or striker's objective is to score goals while a defender's objective is to stop the other team from scoring any goals. If a team concedes a goal, the value of a defender falls by about 0.5% and decreases the value of the goalkeeper by 4.4%. The success of a team also adds to the value of all the players on that team. On average, Rey found that if a team wins either a domestic or a European title, the player's value increases by 5.2%.

The position or popularity of the buying club is also associated with a premium. An excellent club or top tier club will pay on average 197% the value of the player (almost twice what the player is actually worth) and these top tier clubs will also sell players for 75% higher than their value. This makes sense because if a top tier club is interested in a player, the selling club can charge more because they know the top tier club has the financial means to purchase the player. This is an example of bilateral monopoly: in a limited field, both buyers and sellers have market power and negotiate over who will get to capture the associated rents. When these top tier clubs sell their players, they ask for more than the player is worth because they usually don't need the money so they have less of an incentive to sell unless they are making a significant profit. Higher ranked teams will demand more than what the player is worth because they usually pay more than players are worth when they buy players.

In 2009, when English Premier League team Manchester United FC sold their star player, Cristiano Ronaldo, to Spanish Club Real Madrid FC for € 94 million to break the world transfer record, the football world was in shock. Everyone thought Real Madrid overpaid for Ronaldo. In an article written by Alistair Potter of Metro in April 2010, Jerseys sold with Cristiano Ronaldo's name and number have already paid off his € 94 million price tag. In just his first year alone, 1.2 million shirts with "Ronaldo 9" had been sold in Madrid alone. There were millions of shirts sold

around the world because of the worldwide fan base Real Madrid and Ronaldo have. Real Madrid made € 117.5 million from Ronaldo jersey sales not counting marketing production and payments to their jersey manufacturer. Over the last 5 years, Ronaldo has been getting more and more popular due to his performance and because of marketing so jersey sales would have increased with each year he spent at Real Madrid. Potter has scored 179 goals in 167 appearances so far for Real Madrid which is an average of more than a goal per game and the second highest current scoring record in the world. Messi is the only player in the 21st century to have a better game-to-goal ratio for this many games than Ronaldo. Some of Ronaldo's goals have won the UEFA Champions Leagues, Spanish league titles and domestic championships. If his goals could be quantified in Euros, less than 10 of his most important goals would be enough to cover his transfer fee.

According to a football empirical study conducted by Deloitte for the 2012-2013 football season, even with the tough global economic climate, elite football clubs are spending large sums of money for players. The revenue for the top 20 clubs in the world grew by 8% from €5 billion in the 2011-2012 to €5.4 billion in the 2012-2013 season. The study also helps explain why Real Madrid FC broke the world transfer record twice in the last 6 years with the signing for Cristiano Ronaldo and Gareth Bale for €94 and €103.4 million respectively. One of the possible reasons why Madrid is spending so much on players is because it has brought in the most revenue of any football club in the world for the last 9 consecutive years. In addition, Real Madrid is one of the elite clubs in the world so they have to pay the premium associated with that status when buying players. Another reason Real Madrid pays so much for players is because the club has established the "Galacticos" signing which was used by Real Madrid to describe high profile

signings they try to make every summer in order to maintain their status as one of the best clubs in the world. The term is currently used generally in football to refer to very expensive high profile signings by any club.

KEA European Affairs and the Centre for the Law and Economics of Sports conducted a study of the transfer of athletes in basketball, football, and baseball in the United States and Europe in January 2013. This study was conducted as a result of the increasing debt that might threaten stability in the sports industry, new forms of investments in players through third-party ownership (TPO), which endangers the capability of sporting bodies to regulate their activities, and other concerns of the European Union.

The study found that an athlete's talent or market value is not the only determinant of that athlete's transfer fee. The three elements responsible for the difference between the market value of a player and his transfer fee are his image and commercial impact and general speculation by sports experts about the potential ability of the player. The study discovered that the gap between the value of a football player and the transfer fee of the player in Europe has been increasing dramatically from 1994 to 2011. The volume of players transferred between 1994 and 2011 has increased by 220% from about 5,700 players in 1994 to about 18,000 players in 2011, but the total value of those players has increased by over 600%. The total value of the transfers went from about €403 million in 1994 to about €3.2 billion in 2011. The top 5 teams were responsible for 55% of the total value of transfers in 2011.

The increasing transfer fees of players is causing teams to borrow large sums of money, and sometimes these clubs purchase elite players through third party ownership. Although the gross revenue of the top divisions of the 53 UEFA countries used in this study have increased from €9 billion in 2006 to €12.7 billion in 2010, the net loss of these countries has been steadily

increasing to €1.6 billion in 2010. Among the top divisions in the countries studied, 56% of all the teams reported a net loss. This has become a big concern for UEFA because losses decrease the stability and independence of clubs in the European football industry. Beginning in 2015, UEFA is going to start sanctioning and punishing clubs for excessive debts through the passage of its Financial Fair Play Rules.

The Financial Fair Play Rules (FFP) are regulations agreed upon by UEFA in 2009 that will go into effect starting in the 2015-2016 season with the goal of increasing fairness in football by limiting spending across all the leagues in the 56 UEFA countries. For teams competing in UEFA competitions such as the Champions League and the Europa League, the maximum debt allowed is €45 million over the course of three-year cycles if the owner or owners of a club are willing to inject money into the club to cover some of the losses. When owners are incapable of injecting money into a club, the maximum loss permitted over three seasons is €5 million. Punishment for breaking FFP rules can include fines by UEFA, exclusion from UEFA tournaments and exclusion from purchasing players during transfer windows. In the English Premier League, the maximum losses allowed if the owner is willing to inject money into the club is €105 million over the course of three seasons and €15 million if the owner is not willing or able to inject money into the club. Failure to comply with these regulations will result in teams getting docked points with other possible sanctions currently being determined.

The Financial Fair Play Rules are designed to deter excessive spending by clubs in Europe and could lead to clubs keeping balanced books or even record profits. They will hopefully prevent clubs with wealthy owners such as Manchester City and Paris Saint Germaine from getting an unfair advantage by luring the best players in the world.

Critics of the FFP rules believe that these regulations could cause more harm than good by solidifying the top clubs across Europe: because these clubs bring in the most revenue, they will be the only ones capable of purchasing the best players in the world. Club with little revenues will have to depend on their academies to develop talented players because they will not be able to afford the costs of top players even over the course of 3 seasons.

Critics have also pointed out loopholes in the FFP rules, For example, until the end of the 2014-2015 season, clubs can exclude the wages of players signed before 2010 from their account calculations as long as they show signs of decreasing debt. Some clubs such as Chelsea FC PSG and Manchester City took advantage of this loophole by buying a lot of players during that season that they loaned out to other lower clubs so they will not have to include their wages on their accounts.

An article written by Nick Harris for ESPN states that on average the two highest-paying sports teams are Barcelona FC and Real Madrid FC, paying on average \$7,910,000 and \$7,350,000 per year respectively. According to the report, 5 of the top 10 best-paying teams are European soccer teams and the other five are baseball and basketball teams from the United States. These figures are excluding sponsorship deals and other advertising sources of income for players.

Ed Wyman (2014) argued that sports teams, more specifically European football teams, are not immune to the financial hardships that have hit Europe and the rest of the world, so their expenditures should also be regulated. One of the reasons football transfers and player wages should be regulated is because most of these teams are not profitable. For example, Barcelona recorded a debt of over €400 million in 2011. In the same year although Manchester united had decreased its debt by over 69 million Euros, was still 439 million euros in debt.

Ed Wyman argues that the 2008 Financial Crisis proved that there is no such thing as an organization that is “too big to fail,” so why should football teams be allowed to accumulate large amounts of debt? More than 20% of the teams from the lower 4 English football leagues are in financial trouble, caused mostly by overspending in the transfer market. Wyman believes that in addition to the UEFA FFP Regulations, a cap on transfer fees and player wages could not only help decrease the debt held by teams in Europe, but it will make European leagues more competitive. Over the last 10 seasons, most of Europe’s top leagues have been dominated by the top two or three teams. According to a 2013 chart by the Center of Law and Economics of Sports, 92% of the titles in England, 100% of the titles in Spain and 92% of the titles in Italy were won by the top 3 teams from 2000 to 2012. Wyman believes that capping wages and transfer fees could add more competitions in the top European leagues and change these skewed statistics.

This paper seeks to confirm the extent to which team wealth and success affects transfer fees, controlling for other determinants outlined in the literature.

Variables And Data Collection

I am going to be using 10 independent variables to try to determine the transfer value of a football player. I picked these variables based on discoveries I made while looking at literature reviews on the topic and also from my own knowledge of the sport. The dependent variable is the transfer fee or the value of the player and the independent variables are listed and explained bellow.

- **Forward/Midfield:** I am going to be using two dummy variables, forward and midfield, because I believe midfielders and forwards are the most important players on the pitch and there are premiums associated with players in these

positions. Midfielders are creative players that create chances for the forwards to score goals.

- **Age:** The older a player, the less useful years he has left in him so age is an important variable because team should be willing to pay more money as an investment for talented young players. Age should be negatively correlated to transfer fee after a player reaches 29 (which is around the time a player reaches his full potential and starts declining at least physically). When buying players, teams also consider how much they could resell a player for after they no longer need that players services and the younger the player, the more of the investment they can get back when the team decides to sell the player.
- **Height:** As a football player and fan, I know height is important especially with forwards and defenders. The taller a player is, the more effective he will be at heading the ball into the net when attacking or away from the net when defending a free kick or a corner kick. Height is also associated with the strength of a player and his ability to hold the ball (not be pushed off the ball easily by a defender). Height should be positively correlated with transfer fee
- **Appearances:** I am using appearances from the season prior to the transfer because it is the latest available measure of how important a player is to his current team and also shows experience. The more appearances a player has for his team, the more important he is to his team, and the more experienced that player is and therefore the higher his transfer fee will be. Appearances also indicate the fitness level of a player, a player who has played a lot of games for

his current team will be in better physical shape than a player who spends a lot of time on the bench.

- **Goals:** Goals are very important because you have to score more goals than you concede in order to win a soccer game. The value of a player should rise as the number of goals he scores in a season increase.
- **Assists:** A player who can create goals is just as important as the player scoring the goals because if midfielders are not passing the ball to the forwards, the forward will not have chances to try and score goals. All players can have assists (including the goal keeper) but assisting is usually the responsibility of midfielders and forwards. A midfielder with a lot of assists (even if he rarely scores) will be sold at a premium.
- **International stats (appearances, goals and assists):** A player playing for his national team shows that he is among the best players from his country. Playing international soccer shows how easily a player adapts to playing with different players and is also experience outside of the league the player usually plays in. International stats should increase the value of a player because they not only show more experience but also how adaptable a player is.
- **Positions of Buying and selling Clubs.** During my research, I discovered that the more popular a team is (and therefore the higher in the league table a team finishes) the more that team has to pay for players and that team can also charge a premium for players it sells. This could be a possible explanation for why less popular clubs get bargains on players that elite clubs will have to pay 3 to 5 times the for.

The Appendix provides descriptive statistics for my dependent and explanatory variables.

Initial Hypothesis and Model

I recognize that my independent variables will not account for the whole variation in transfer fees, other intangible elements such as the image of a player and the potential jersey sales will also affect the transfer fees of soccer players. But hopefully these will not distort my results. The complete model is:

Transfer Fee = f' (age, height, appearances, goals, assists, intern appearances, intern goals, intern assists, position, position of buying club, position of selling club)

From a human-capital perspective, the strongest variables should be the appearances, the goals, the assists and the age of the players. With the exception of age, I expect a positive effect of all these variables and the transfer fees. I expect age to have a positive correlation with the transfer fee (due to experience) up 28 or 30 year olds and then a negative correlation because players physical abilities start to decline at around 30 years of age.

Results

Upon completing my data collection, I ran a basic regression of all the independent variables (Forward and Midfield, Age, Height, Appearances, goals, assists, international appearance, international goals, international assists, position of buying and selling clubs) on the dependent variable (Transfer fee). From my initial observation, although I had a good R^2 of 55.4% , my results were a bit confusing because some of the independent variables that I was expecting to have the largest impact on the transfer fees were insignificant at the 5% level. I decided to test for heteroskedasticity and collinearity and run a stepwise regression in order to determine which variables are the most important to my model.

To test for heteroskedasticity, the Breusch-Pagan / Cook-Weisberg test was used to determine the probability that the errors stay constant as the independent variables change. The test showed that there was 0% chance that there was no heteroskedasticity in my data as shown by the table below.

Ho:	Costant Variance
Variables:	Fitted values of transferfee
chi2(1)	104.81
Prob > chi2:	0.000

Because of the above results, heteroskedasticity must be corrected for before moving on with other tests and regression analysis. Heteroskedasticity can be corrected for by using the robust standard errors in order to relax the OLS assumptions that errors are both independent and identically distributed.

. After correcting for heteroskedasticity and examining the independent variables, only 4 of my twelve independent variables were significant at the 5% level: the positions of the buying and selling club, international appearance, and assists. Some of the insignificant ones are quite surprising because I was expecting them to be the most important.

Based on my initial research and general soccer knowledge, strikers and midfielders tend to carry a premium because they score and create goals respectively and a team that is not creating or scoring goals cannot win a soccer match. The most expensive players ever sold have always been strikers and midfielders and after looking through my raw data, I noticed that the top 10 most expensive players in my data were strikers and midfielders so it was strange to see that those two variables are insignificant.

Another surprising variable that was insignificant is age. A young talented player is a long-term investment because a team can help the young player improve his skills and he can play for many years to come so I was expecting age to be a significant factor in transfer fees. One possible explanation for why age is insignificant could be because younger players, although often very talented, lack experience and mental strength that the older players have.

Height was another one of the independent variables that was insignificant. Although I was expecting it to be somewhat significant it was less surprising to see it was not. Height is important for defenders and strikers but it all depends on the style of play of each player. The strikers and defenders that are not tall tend to be quicker which makes up for the lack in height.

Appearances not only represent how important a player is to his current team, but they also represent fitness and experience and for appearances to be insignificant at the club level did not make sense. It is counterintuitive that appearances are insignificant while international appearances (intapps) are significant. Maybe international appearances are more important because they mean that a certain player is among the best from his country and that holds more weight than being one of the best from his club.

The number of goals a player scored in the season prior to transfer, represented by the independent variable goals, was also insignificant. Goals are what wins football matches and the fact that they were insignificant was surprising. A team with a bad defense can win games by outscoring their opponent but if a team does not score goals during a match, the best they could do is get a draw.

The number of assists a player contributed in the season prior to a transfer seems to have a significant impact on that player's transfer fee. Creating a goal is almost as important as scoring one and it was not a surprise to see assists among the statistically significant independent

variables. Midfielders are judged based on the amount of goals they create every season so a midfielder who has a lot of assists will cost a lot of money to the clubs interested in his services.

Although I was expecting international appearances to be somewhat significant, I was surprised at how important they turned out to be. Some of the current best players in England, such as Manchester United's Juan Mata and Manchester City's David Silva, struggle to make it on the Spanish national team. And the current top scorer in England, Harry Kane, can only get on the English team as a substitute while below-average players like Newcastle United's Cheick Tiote regularly make the Ivory Coast national team. It is because of the massive gap in the ability of international teams that made me doubt the importance of international appearances. Getting on Spain's and Germany's national team (the current World Cup winners) is a huge achievement for a player and there are players who play regularly in the elite clubs in the world that still have not garnered such achievements. Playing on the international stage exposes players to the world, and maybe because these players become better known by the whole footballing world, their services become more sought-after and expensive.

International goals and assists were insignificant at the 5% level. This was not surprising because a player making it on the national team improves his value by exposing himself to the world regardless of how many goals he scores or assists he makes. This further supports the earlier argument that international appearances increase a player's value by exposing him to a larger audience.

When a player moves from one club to another, the positions of the teams involved in the transfer have a huge effect on the transfer fee. A player's Transfer fee can be as much as five times his value if the team buying is at the top of the tables and therefore an elite team and as much as three times. This is due to the fact that everyone knows teams like Paris Saint Germain

FC, Chelsea FC, Manchester City FC and recently AS Monaco have unlimited capital made available to them by their wealthy owners so if anyone these teams or other top teams are interested in a player, a huge premium can be added. Even if these teams end up not buying the player, because of the large asking price they refused to pay, whichever team decides to buy the player will have to pay closer to the asking price than the actual value of the player. When big rich teams are interested in a player, it becomes front-page news on sports websites and websites dedicated to just football transfer rumors, and fans like myself will be exposed to players we probably did not even know exist. These rumors might even cause fans to put pressure on their teams to buy players that they did not have a huge interest in.

I decided to run a stepwise regression before making my final model to see which independent variables improve my model the most and which ones can be eliminated. As I was expecting, the buying and selling club variables were the first two followed by appearances, international appearance (intapps), assists, height, international assists (intassists), and international goals (intgoals). Although *appearances* was insignificant, it was the third in the stepwise regression and height seems to also be important. I decided to run another regression using these variables to see if they will be significant. After running the regression, international assists (intassis) became significant so I am going to include it as the 5th independent variable in my final model.

Before creating my final model, I took another look at the descriptive statistics and saw that the cheapest player in my data was sold for €585,000 while the most expensive player was sold for €90 million. I had a large standard deviation so I decided to take the natural log of transfer fee and changed the variable to *lntransferfee*. After running the regression again, checking for heteroskedasticity and correcting for it, the independent variables *appearances* and

goals became significant and the R^2 also increased to .5858. Because of how important appearances and goals are to soccer players, the significance of these variables made the model more realistic and believable.

A football player gets an appearance when he is featured in a game regardless of whether he played 30 seconds at the end of a game or whether he played the whole 90 minutes. I wanted to use minutes played over the season because it would have been a more accurate description of how much a player was used in a season and would have most likely been more significant. However, those data are not available.

For goals, I wanted to exclude penalties scored from the count. A Penalty in football is when a player is given a free shot at goal from 12 yards away and it is scored more often than not. Each team usually has a designated penalty taker and it is usually a striker or a midfielder. I wanted to remove penalties from goals scored because penalties inflate the number of goals scored by the taker and are not an accurate representation of that player's performance because some player can take up to 10 penalties a season.

Before building the final model, I plotted the independent variable age against the transfer fee and noticed that age was normally distributed. This was not surprising because it was something I discovered in the literature review and labor economics also shows that wages and age have a normal distribution. Because Age was normally distributed, I decided to include age squared (*agesq*) in my model, modeling the non-linear relationship of age to transfer fees. Age and *agesq* were included in the model because they were both significant. I ran a stepwise regression to discover that the significant variables that added the most to the model were in the following order: *sellingclub*, *appearances*, *buyingclub*, *goals*, *intapps*, *agesq*, *age*, *intassists* and *assist*. It was gratifying that nine of the thirteen variables in my model are significant and the R^2

also increased to .6471. The final model is shown in Table 6. After Changing transfer fees to *Intransferfee* and age to *agesq*, international assists (*intassists*) took a negative coefficient. I was expecting a positive relationship between international assists and transfer fee so this negative coefficient might have been caused by collinearity between *intassists* and other variables in the model.

The final model explains 64.71% of the variation in transfer fees. Although some of the variables I was expecting to be significance were not incorporated into the model, it is a satisfactory result.

This model shows that although performance statistics are important in determining transfer fees, there is a lot more to the transfer fee of a player than just his abilities on the field. Teams probably take into account the number of football-jersey sales caused by signing a new player in addition to his performance. This was shown by one of the biggest transfer “flops” in the premier league, the transfer of Fernando Torres from Liverpool FC to Chelsea FC for a premiere league record breaking of €60 million in 2011. Although he underperformed even for an average striker in the premiere league, the jersey sales that Fernando Torres brought in alone were enough to cover the amount of money Chelsea paid for him. On top of jersey sales, he scored some very important goals in the UEFA Champions League that lead to Chelsea FC winning the Champions League for the first time in the history of the club.

After mediocre seasons at Chelsea and AC Milan, there were a lot of rumors about Torres going back to his childhood club Atletico Madrid in Spain. In the 2015 January transfer window, Atletico Madrid signed Fernando Torres on loan from AC Milan. In Spain, when high profile players are signed, they have unveiling ceremonies to show the player to the fans. In the case of Fernando Torres, the Atletico Madid stadium, which holds up to 54,900 spectators, was sold out.

Close to 55,000 spectators bought tickets and some even bought jerseys just to come see a mediocre player at the end of his career walk onto the soccer field, say a few words and throw a few balls into the crowd. A lot of football analysts believe that Atletico Madrid's decision to bring back Torres was a successful marketing strategy.

Players are important marketing tools for their clubs. Football clubs need players to be the faces of their teams and it is not always the best performing players that are used in advertising posters. At the end of the 2014/2015 summer transfer window, Angel Di Maria transferred from Real Madrid to Manchester United. A few weeks later, The Barcelona FC director of football stated that Real Madrid sold Di Maria because he was "too Ugly and his image does not fit with the Galacticos Image" the Real Madrid president was trying to create. Although this statement was made by the president of a rival club, it doesn't mean that it doesn't hold any value. Real Madrid does have a lot of players that, although are very accomplished footballers, are considered to be very attractive. Cristiano Ronaldo, David Beckham, Sergio Ramos just to name a few are all Real Madrid FC players that are models in addition to being great football players. When looked up David Beckham on google images, the first few pages of his pictures are not of him playing soccer but of him modeling for Calvin Klein Underwear and other big designer brands.

When I was collecting data for this study, I did consider adding looks as one of my independent variables but I couldn't figure out an effective way to quantify it. After reading articles about the Di Maria claims, I wished was able to include looks into my study because it would have been interesting to see if looks would have a significant effect on transfer fees.

Football players are important marketing tools for the clubs they play for. Two great examples of players as marketing tools are Cristiano Ronaldo and David Beckham. When I

moved to the United States for college, I saw a lot of posters of David Beckham and Cristiano Ronaldo hanging in many girls' rooms in my dorm and although some of the girls were football players and fans, the majority only had the posters because they found the players attractive. Beckham and Ronaldo were not only great football players, but they are fashion models and both now have their own product lines with Adidas and Nike respectively.

Although the positions of the buying and selling clubs were included in the study, future research might want to add a dummy variable for teams like Chelsea FC, Paris Saint Germain FC, Manchester City FC and AS Monaco because these teams are owned by people or corporations (airlines), that have large sums of money at their disposal and are willing to spend upwards of €200 million a season on players. Because everyone knows these facts about these teams, when they show interest in a player, the price of the player can double or triple because everyone knows that money is not an issue for these teams.

Conclusion

Although there is a common belief shared by most football fans that statistics do not drive the sport, I thought player performance statistics would be very important in determining transfer fees for football players. After this study, although statistics are important, in the case of this study explaining about 65% of the variation in transfer fees, there are other things to consider as well. Just in this study, the position of the buying club and the selling club proved to be more important than many other markers of the player's ability in determining the transfer fee of a player.

Although I am satisfied with my findings, there are a few other variables that I wish I could have included in my study but I could not because they were very difficult to acquire. I

would have substituted appearances both club and international for minutes played because a player only has to be on the field for a few seconds to count as an appearance and minutes played would have been a more significant variable in determining the amount of time a player played in the previous season. I also wanted to include variables such as average number of passes completed average number of dribbles, average distance covered per game and specialty traits such as speed dribbling and creativity. All these statistics are very difficult to find but as football is incorporating more and more technologies, such as the goal line technology (sensors that tell referees if the whole ball has crossed the goal line in order to award or disallow a goal), in the next 5 to 10 years these statistics might be available for someone to create a more accurate model. Footballers and fans believe that technology will not only slow down the sport, but take away the human aspects of the sport by removing all controversies and the possibility of mistakes by referees which is why many fans like me do not welcome technology.

Prior to this study, I believed that teams are overpaying for players like Fernando Torres, Gareth Bale and David Luiz. I always wondered if there was something else other than performance that football clubs were looking for in players that drives them to pay millions in premiums or sometimes up to 5 times the market value of players in order to acquire their services. This study showed that performance although important is not a crucial factor in determining the transfer fee of a football player.

Appendix

Variable definitions, means and standard deviations (all data are from transfermark.com/en/)

Variable	Abbreviation	Mean	Standard Deviation	Definition
Transfer fee	<i>transferfee</i>	14,192,760	14656728	Dependent variable Price paid by the club buying a player
Log Transfer Fee	<i>lntransferfee</i>	16.02	0.99	Natural log of transfer fee
Forward	<i>forward</i>	0.39	0.49	Dummy variable for forwards
Midfield	<i>midfield</i>	0.35	0.47	Dummy variable for midfield players
Age	<i>age</i>	25	3.41	Age of the player at the time of transfer
Age squared	<i>agesq</i>	636.55	172.12	The squared value of the variable age
Height	<i>height</i>	1.82	.064	The height of players in meters
Appearances	<i>appearances</i>	36	9.46	The number of games a player played in in the previous season
Goals	<i>goals</i>	8.26	8.31	The number of goals a player scored in the previous season
Assists	<i>assists</i>	5.39	5.69	The number of assists a player made in the previous season
International appearances	<i>int apps</i>	4.91	4.56	The number of international games a player played in in the previous season
International goals	<i>int goals</i>	0.82	1.54	The number of goals a player scored for his country in the previous season
International assists	<i>int assists</i>	0.62	1.32	The number of assists a player made for his country in the previous season
Selling club	<i>selling club</i>	2.08	1.20	The position of the selling club in the league in the previous season
Buying club	<i>buying club</i>	2.27	1.22	The position of the buying club in the league in the previous season

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Table 1: Initial Regression

Source	SS	df	MS			
Model	1.8228e+16	12	1.5190e+15	Number of obs = 154		
Residual	1.4639e+16	141	1.0382e+14	F(12, 141) = 14.63		
				Prob > F = 0.0000		
				R-squared = 0.5546		
				Adj R-squared = 0.5167		
				Root MSE = 1.0e+07		
transferfee	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
forward	-1505901	2940571	-0.51	0.609	-7319209	4307407
midfield	-1163443	2377100	-0.49	0.625	-5862806	3535920
age	106550	250777.4	0.42	0.672	-389219.8	602319.9
height	1.66e+07	1.44e+07	1.15	0.253	-1.20e+07	4.51e+07
apperances	89620.68	105620.8	0.85	0.398	-119184.4	298425.8
goals	123166.9	159313.9	0.77	0.441	-191785.7	438119.5
assists	1014135	200954.7	5.05	0.000	616860.8	1411408
intapps	673572.8	242268.9	2.78	0.006	194623.8	1152522
intgoals	1216689	779642.8	1.56	0.121	-324611	2757990
intassists	-1643076	870490.5	-1.89	0.061	-3363976	77824.43
sellingclub	-2616816	807138.7	-3.24	0.001	-4212474	-1021158
buyingclub	-2829519	849475.5	-3.33	0.001	-4508874	-1150164
_cons	-1.88e+07	2.81e+07	-0.67	0.504	-7.43e+07	3.67e+07

Table 2: Robust Initial Regression

Linear regression						
				Number of obs = 154		
				F(12, 141) = 9.91		
				Prob > F = 0.0000		
				R-squared = 0.5546		
				Root MSE = 1.0e+07		
transferfee	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
forward	-1505901	2665153	-0.57	0.573	-6774725	3762923
midfield	-1163443	2074285	-0.56	0.576	-5264161	2937276
age	106550	236711.2	0.45	0.653	-361411.7	574511.8
height	1.66e+07	1.15e+07	1.45	0.151	-6096824	3.92e+07
apperances	89620.68	104263.1	0.86	0.391	-116500.3	295741.6
goals	123166.9	179863.1	0.68	0.495	-232410.1	478743.9
assists	1014135	322102.4	3.15	0.002	377360.1	1650909
intapps	673572.8	274122.5	2.46	0.015	131651.3	1215494
intgoals	1216689	947623.8	1.28	0.201	-656697.9	3090077
intassists	-1643076	855058	-1.92	0.057	-3333467	47315.45
sellingclub	-2616816	626407.8	-4.18	0.000	-3855182	-1378451
buyingclub	-2829519	644342	-4.39	0.000	-4103339	-1555699
_cons	-1.88e+07	2.28e+07	-0.82	0.411	-6.40e+07	2.63e+07

Table 3: Significant Variables From Table 2

Linear regression

Number of obs = 154
 F(5, 148) = 18.55
 Prob > F = 0.0000
 R-squared = 0.5213
 Root MSE = 1.0e+07

transferfee	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
assists	942588.3	254927.7	3.70	0.000	438820	1446357
intapps	445448.6	252672.9	1.76	0.080	-53863.96	944761.2
intgoals	1140480	945738.2	1.21	0.230	-728414.6	3009374
sellingclub	-2547006	578779.8	-4.40	0.000	-3690746	-1403267
buyingclub	-3077223	609056.8	-5.05	0.000	-4280794	-1873652
_cons	1.83e+07	2229643	8.20	0.000	1.39e+07	2.27e+07

Table 4 : Natural Log of Transfer Fee

Source	SS	df	MS	Number of obs = 154		
Model	89.4250743	12	7.45208952	F(12, 141) =	16.62	
Residual	63.2214518	141	.448379091	Prob > F =	0.0000	
Total	152.646526	153	.997689713	R-squared =	0.5858	
				Adj R-squared =	0.5506	
				Root MSE =	.66961	

lntransferfee	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
forward	.2254984	.1932433	1.17	0.245	-.1565303	.6075271
midfield	.2398524	.156214	1.54	0.127	-.068972	.5486769
age	-.0239678	.0164801	-1.45	0.148	-.0565479	.0086124
height	.9763882	.949294	1.03	0.305	-.9003009	2.853077
apperances	.0182844	.006941	2.63	0.009	.0045625	.0320062
goals	.0140937	.0104695	1.35	0.180	-.0066038	.0347912
assists	.0179889	.013206	1.36	0.175	-.0081184	.0440963
intapps	.0536336	.015921	3.37	0.001	.0221589	.0851083
intgoals	-.0004669	.0512352	-0.01	0.993	-.1017554	.1008215
intassists	-.1082374	.0572054	-1.89	0.061	-.2213285	.0048536
sellingclub	-.315097	.0530421	-5.94	0.000	-.4199577	-.2102364
buyingclub	-.2008231	.0558243	-3.60	0.000	-.311184	-.0904623
_cons	14.71377	1.845516	7.97	0.000	11.06531	18.36222

Table 5: Natural Log of Transfer Fee Robust

Linear regression

Number of obs = 154
 F(12, 141) = 16.04
 Prob > F = 0.0000
 R-squared = 0.5858
 Root MSE = .66961

Intransfer~e	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
forward	.2254984	.1880313	1.20	0.232	-.1462266	.5972234
midfield	.2398524	.1505266	1.59	0.113	-.0577283	.5374332
age	-.0239678	.020925	-1.15	0.254	-.065335	.0173994
height	.9763882	.8657996	1.13	0.261	-.7352383	2.688015
apperances	.0182844	.0073055	2.50	0.013	.0038419	.0327268
goals	.0140937	.0096903	1.45	0.148	-.0050633	.0332507
assists	.0179889	.0135276	1.33	0.186	-.0087542	.0447321
intapps	.0536336	.0163375	3.28	0.001	.0213355	.0859317
intgoals	-.0004669	.0609894	-0.01	0.994	-.1210387	.1201048
intassists	-.1082374	.0812165	-1.33	0.185	-.2687969	.052322
sellingclub	-.315097	.0536582	-5.87	0.000	-.4211755	-.2090186
buyingclub	-.2008231	.0526718	-3.81	0.000	-.3049516	-.0966947
_cons	14.71377	1.816032	8.10	0.000	11.1236	18.30393

Table 6: Final Model

Linear regression

Number of obs = 154
 F(9, 144) = 25.95
 Prob > F = 0.0000
 R-squared = 0.6471
 Root MSE = .61164

Intransfer~e	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
sellingclub	-.2577932	.0490788	-5.25	0.000	-.3548011	-.1607853
apperances	.0130284	.0063774	2.04	0.043	.0004229	.0256339
buyingclub	-.1957335	.0475394	-4.12	0.000	-.2896986	-.1017683
goals	.0147163	.0052418	2.81	0.006	.0043554	.0250772
intapps	.0561489	.0140504	4.00	0.000	.0283771	.0839206
agesq	-.0185221	.0039798	-4.65	0.000	-.0263886	-.0106557
age	.9080594	.2020686	4.49	0.000	.5086556	1.307463
intassists	-.1015643	.052037	-1.95	0.053	-.2044193	.0012906
assists	.0216187	.0118405	1.83	0.070	-.001785	.0450224
_cons	5.175245	2.54386	2.03	0.044	.1471138	10.20338