

Valuation of Football Players

A Complete Pricing Framework

By: Anders Munkhaugen Gulbrandsen

Christian Munkhaugen Gulbrandsen

Supervisor: Jøril Mæland

Specialization: Economic Analysis

NORGES HANDELSHØYSKOLE

This thesis was written as a part of the Master of Science in Economics and Business Administration program - Major in Economic Analysis. Neither the institution, nor the advisor is responsible for the theories and methods used, or the results and conclusions drawn, through the approval of this thesis.

Abstract

In this thesis we will describe a football player's value to a football club. First we will explore how a player can generate revenue. In doing so, we will describe two valuation factors, where a football player can fulfil none, one or both of them. The two factors will describe how a football player can generate revenue for his club. Next we will present a valuation model based on theory from option pricing. The valuation model will be linked up to the two factors, and give us the financial value of a football player. A player's financial value can differ among clubs. So, in the case of a potential transfer the clubs involved must negotiate a transfer fee, while the buying clubs must negotiate a salary with the player. We will present a bargaining framework to discuss which parties have bargaining power. With this framework we can also discuss outcomes of transfer fee and salary.

Foreword

This thesis is written as the final part of the Master of Science in Economics and Business Administration program at Norges Handelshøyskole.

When we were given the opportunity to work on a topic of our own choice for a full semester, we thought choosing a topic we were interested in would be motivating. It certainly was. Football is the biggest sport in the world, and especially transfer fees and wages are sources of controversy so we wanted to find out more about these variables; and our analytical major in Economic Analysis gave us the foundations necessary to create a model where financial theory and game theory are central elements. So, could we create a model that not only would explain past transfer fees and wages, but also help determine transfer fees and wages in future transfers?

When you create a model like this there are always some factors and uncertainties you will not be able to account for, and there will always be questionable assumptions (e.g. complete information). But we feel that we have combined theory and practice in a way that certainly explains a big part of the transfer fee and player wage.

We would like to thank our advisor, Jøril Mæland, for being accessible and helpful during the process.

Bergen, 07.06.2011

Anders Munkhaugen Gulbrandsen, Christian Munkhaugen Gulbrandsen

Contents

- 1. Introduction 1
 - 1.1 Research topics..... 2
- 2. Motivating example..... 2
 - 2.1 The simple case 2
 - 2.1.1 Central results..... 7
 - 2.1.2 First attempt at bargaining..... 7
 - 2.2 The more realistic case 9
- 3. The economics of football and the labour market..... 11
 - 3.1 Models for football club behaviour 12
 - 3.1.1 Rationality and profit maximisation..... 12
 - 3.1.2 Win at any cost vs. sustainability 13
 - 3.1.3. The football club as a revenue maximiser..... 14
 - 3.2 The labour market 17
 - 3.2.1 The Bosman ruling 17
 - 3.2.2 General regulations from FIFA 18
 - 3.2.3 The transfer from A to Z 19
 - 3.2.4 Loan, option to buy, performance clause in transfer fee, third-party owners 20
- 4. Research topic 1: What value can a football player add to a football club? 23
 - 4.1 Possible valuation factors – identifying Increased Revenue (IR) and Decreased Revenue (DR) in the NPV condition..... 23
 - 4.1.1 Matchday revenue 24
 - 4.1.2 Broadcast revenue 28
 - 4.1.3 Commercial revenue..... 30
 - 4.1.4 Conclusion..... 32
 - 4.2 The valuation model..... 33
 - 4.2.1 The case of asymmetric information in football 34

4.2.2	First approach – implementing ‘increased performance’	35
4.2.3	Interpreting the model	41
4.2.4	Second approach – Implementing ‘fan appeal’ in the model.....	52
4.2.5	Conclusion.....	55
4.3	Applying the valuation model	56
4.3.1	The valuation factors	56
4.3.2	The variables, coefficients and derivatives	57
4.3.3	The financial value	61
5.	Research topic 2: How much will the club have to pay for the player?.....	64
5.1	Literature review	65
5.2	Interdependencies and different market structures need to be accounted for	69
5.3	Factors determining bargaining power.....	72
5.3.1	Player specific factors	73
5.3.2	Selling club specific factors	79
5.3.3	Buying club specific factors	81
5.3.4	The bargaining power framework with one buyer	82
5.3.5	Competing bidder specific factors.....	85
5.3.6	The bargaining power framework with several buyers	90
5.4	Conclusive remarks on the bargaining model	92
5.4.1	The transfer of Thierry Henry	92
6.	Conclusion.....	96
	References	98
	Appendix	107
	Multivariate Ito’s Lemma.....	107

1. Introduction

On June 11, 2009, several newspapers could report a new world record transfer deal: English side Manchester United had accepted a mind-blowing €94m offer – dwarfing the old world record of €76m from 2001 – for their Portuguese star, Cristiano Ronaldo, from Real Madrid from Spain (Goal, 2009a). Critics – such as the UEFA (the European football association) president, Michel Platini, and FC Barcelona vice president, Jaume Ferrer, – claimed the transfer fee was damaging to football and that no player is worth that much (Goal, 2009b; Goal, 2009c). Less than one year after, however, some sources reported that Ronaldo was going to be the most profitable player in the history of Real Madrid (Mercopress, 2009). The sales from 1.2 million replica shirts and other merchandise in Madrid alone had already covered the €94m transfer fee; and in the coming years it is expected that he will generate up to €200m for the club in advertising and other publicity revenue (PRLog, 2010). And then we are not considering his contribution to revenue through sporting performance, i.e. prize money for performing well in competitions, which is also very high. The result is: subtract his yearly wage of more than €10m (Ogden, 2009) and you will still get a positive cash flow.

Leeds United from England, on the other hand, experienced the quite opposite (Cathcart, 2004). When facing the possibility of great sporting success – which in turn resulted in big revenues – they invested heavily in new players; a strategy working well in the 1999/2000 and 2000/2001 seasons. They were able to raise some of the money through relatively short-term financing, and paid off the debt with prize money from competitions. In the 2001/2002 season, however, the team failed to deliver high enough performance. Consequently, they did not get the needed revenues to service the debt or their huge wage bill and they had to sell off players. This sent the club into a downwards spiral which ultimately forced the club into administration and relegation six years later, in 2007 (Harris, 2007). Effectively, this meant that one of the top clubs in Europe in 2001 played at the third English level in 2007; a dramatic downfall that can be traced back to unsuccessful player investments and too expensive financing. Today, more than ten years later, they are still trying to recover: currently (2010/2011 season) they are playing in the second highest level in England.

What happened in these two cases? Did Real Madrid make a killing? Why did Leeds United's strategy go so horribly wrong? This thesis aims to answer those questions.

1.1 Research topics

What value can a football player add to a football club; and, how much will the club have to pay for that player?

2. Motivating example

When you write about untraditional subjects, like applying financial models and investment theory to football, one of the challenges is to make the topic accessible for everyone in your target audience. In taking that task seriously, this introduction will hopefully prove informative and also motivate our research topics.

2.1 The simple case

Imagine a football club, doesn't matter where, that consistently achieves a league position of, say, 7th place. There are 20 teams in this particular league, the top 5 qualify for the European cup and the bottom three relegate to the lower, less glorious division. The clubs receive a bonus from the national football association depending on the position they achieve in the league. On matches the club fills up 75% of the 30.000 seats of the stadium, on average. The media coverage contract is negotiated by the national football association and the clubs in the league share the proceeds equally. The club's other sources of revenue are a sponsor deal and sale of supporter equipment.

Now, the owner of the club wants to improve the performance of the team so they can qualify for the European cup in which all the best teams in Europe compete. This European cup will dramatically increase the revenue of the club. But to qualify, as already explained, they must achieve a league position of top 5. The manager and the staff of the club have successfully identified a player who, if they buy him, will make the team achieve a position in the top 5 and hence be eligible for the profitable European cup.

For a finance scholar two interesting questions arise: What value can this player add to the club? And, how much will the club have to pay for him?

To make a valuation of the player we need to quantify the impact on team performance and other possible effects such as increased attendance and sales, in cash flow terms. In this stylized example we assume no uncertainty, no taxes, full information, the club has ample financial slack to buy the player; the transfer market is imperfect, i.e., there exists positive NPV transfers. Further, investing in the player will not increase the costs of the club and the

club will not have to do additional investments compared to a situation of not signing the player. To simplify even further, the duration of the effect of the player is one year, or one season in football terms, so we are talking about a onetime gain. We will, of course, relax all of these assumptions later.

	Without	With	Incr. revenue
League position	7	5	
Bonus	13 000 000	15 000 000	2 000 000
Media revenue	20 000 000	20 000 000	-
Stadium tickets	5 000 000	5 000 000	-
European cup			
	No	Yes	
Bonus	0	10 000 000	10 000 000
Stadium tickets	0	1 000 000	1 000 000
Other			
Sponsor deal	3 000 000	3 000 000	-
Sales	2 000 000	2 500 000	500 000
			13 500 000

Table 1 Effects of new player

Table 1 shows an attempt in quantifying the effects described above. As we can see, the increased revenue is €13.500.000. But is this the price they are willing to pay for the player, ignoring discounting? No. We need to account for a factor we have not mentioned yet: the player’s salary. By including player salary we will be able to define the value added or present value of the player:

$$\text{Value added} = \text{Increased revenue} - \text{player salary in buying club}$$

This is then the price they are willing to pay, but is it also the price they have to pay? Not necessarily. We have to look at how important, in PV-terms, the player is to the selling club. By applying the same assumptions as before and treating the loss of the player as a onetime loss we get the following expression:

$$\text{Value lost} = \text{decreased revenue} - \text{player salary in selling club}$$

As we will see, the buying club has to compensate for the selling club’s “Value lost” with a transfer fee. Therefore, it is immediate that a transfer can only be possible if the value gained by the buying club is greater than, or equal to, the value lost by the selling club, in absolute terms:

$$Value\ added \geq Value\ lost$$

This is an obvious but, nevertheless, important result that is valid regardless of our assumptions. We will refer to this result as the transfer condition. By examining the two expressions, we see that increasing the salary (*ceteris paribus*) will decrease the value added for the buying club. For the selling club, increasing salary (*ceteris paribus*) will decrease the value lost. Note that the player's salary does not have to be equal in the two clubs. Actually, the only unknown variable is the player salary in the new club so we are able to express the transfer condition as an inequality with one unknown:

$$IR - S_{BC} \geq DR - S_{SC}$$

=>

$$S_{BC} \leq IR - DR + S_{SC}$$

Increased revenue (IR), decreased revenue (DR) and player salary in selling club (S_{SC}) are known variables whereas player salary in buying club (S_{BC}) is yet to be decided. To exclude an unrealistic (negative) outcome of S_{BC} we require that all variables be greater than or equal to zero. The rationale behind non-negative salary is obvious. Non-negative increased revenue is also straight forward. We defend non-negative decreased revenue, the equivalent of saying that the player is actually hurting the club's revenues, by saying that this player would be removed if this happens. Note, however, that value lost can be negative. This happens if $DR < S_{SC}$. That is, the player is hurting the club's financial value and the club will be better off by selling or firing the player if that is possible.

Let us now introduce the transfer fee (T) or investment cost so we can define the NPV of the buying club (BC) and selling club (SC):

$$NPV_{BC} = IR - S_{BC} - T \geq 0$$

$$NPV_{SC} = T - DR + S_{SC} \geq 0$$

Player salary in buying club (S_{BC}) and the transfer fee (T) need to be decided somehow – we will come back to that. The other variables are known. Observe that for particular values of IR, DR and S_{SC} there are combinations, or negotiation outcomes, of T and S_{BC} that can make both clubs as well as the player (at least in salary-terms) better off. The transfer is therefore desirable from a Pareto optimal perspective: both clubs will have NPV greater than zero and the player will get a higher salary.

By reorganizing the terms we can find boundaries for the unknown variables:

$$\text{From } NPV_{BC}: T \leq IR - S_{BC}$$

Transfer fee has to be less than or equal to the increased revenue less player salary expense.

$$\text{From } NPV_{SC}: T \geq DR - S_{SC}$$

The transfer fee has to compensate for the loss in revenue less saved salary expense. Combining these two boundaries we get:

$$IR - S_{BC} \geq T \geq DR - S_{SC}$$

which we will call the NPV condition. It is easy to see that the NPV condition is an extension of the transfer condition; we just incorporate the transfer fee, T. Later, we will show that the NPV condition creates multiple bargaining situations between player and buying club and between buying and selling club.

Below we illustrate the transfer condition and the NPV condition. Both need to be satisfied before a transfer can take place. Note that the NPV condition implies the transfer condition but the transfer condition does not imply the NPV condition because of the transfer fee, so the NPV condition is more restrictive. The figure can actually explain many of the real life situations in the transfer market in a simple way, so we will explain it in detail. It may seem lengthy, but bear with us – it may prove helpful.

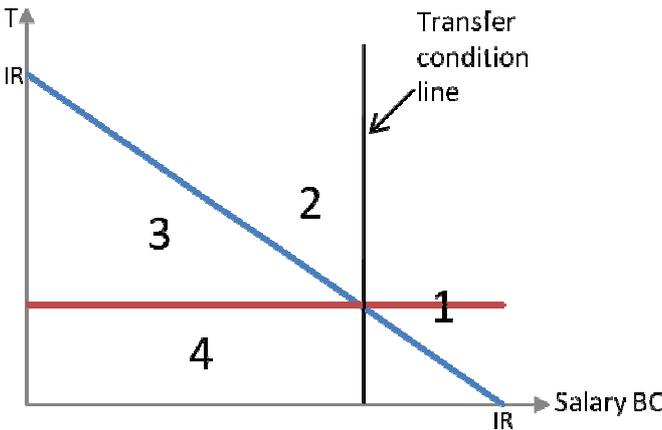


Figure 1 Graphical representation of transfer and NPV condition

The red, horizontal line represents the NPV condition for the selling club: $T \geq DR - S_{SC}$. In order to satisfy the NPV condition for the selling club, the transfer fee has to be on or above

this line. The blue, sloping line is the NPV condition for the buying club: $T \leq IR - S_{BC}$. The transfer fee has to be on or below this line in order to satisfy the NPV condition for the buying club. Where the two lines cross, we have the transfer condition, $IR - S_{BC} = DR - S_{SC}$, which is independent of the transfer fee.

In area 1, to the right of the transfer condition line, the transfer condition is not satisfied: $IR - S_{BC} < DR - S_{SC}, \forall T$. In real life this can explain a situation where a smaller club goes after a player from a bigger club, and that player is important for the bigger club. Then IR will often be less than DR, and the player will typically not settle for less than his current compensation: the transfer breaks down. That is why you rarely see ‘good’ players, in the sense that they are important for the bigger club, moving from big clubs to smaller clubs.

The transfer condition is satisfied in area 2 but the sum of transfer fee and salary required is too high for the buying club, giving a negative NPV, so they do not want to buy the player and a transfer will not take place. This is a normal situation when a small club’s star player is targeted by a bigger club, and the small club and/or player is too demanding. For the transfer to take place the transfer fee and/or player salary has to be set lower, for instance through negotiation.

In area 4 the transfer fee is too low for the selling club, giving negative NPV, so they do not want to sell the player. A typical situation when an attractive star player from a small club has expressed his discontent and wish to move to a bigger club. The big club takes advantage of this and makes a disgracefully low offer. Again, this can be solved with negotiation.

Area 3, then, gives the only set of combinations of transfer fee and salary that supports a transfer. The salary required and transfer fee is in an interval satisfying the NPV condition. We could have put a stricter restriction on the salary variable, S_{BC} , for instance $S_{BC} > S_{SC}$, giving a vertical line to the left or right of the transfer condition line. A line to the right of the transfer condition line would then make a transfer impossible, and a line to the left would make the upper limit of the transfer fee lower and the lower limit of the salary higher. But we have chosen not to impose a stricter restriction on the salary. This is to preserve the possibility that, e.g., the player wants to join the BC so much that he is willing to reduce his pay check. Or that the player is unable to command a higher salary from the buying club, because he is past his prime.

2.1.1 Central results

It is time to sum up our findings. We have described a transfer market with three participants: The buying club, the player and the selling club. First we found the transfer condition saying that the present value of the player has to be higher in the buying club than in the selling club. This is because the buying club will have to compensate for the selling club's loss, otherwise they will be better off by not selling the player. Then we extended this argument with the NPV condition claiming that a transfer should only take place if the clubs are not worse off by the transfer, i.e., NPVs of the clubs are not negative. Put in another way, for a transfer to be possible we need the transfer condition to be satisfied

$$\text{Value added} \geq \text{Value lost},$$

but for the transfer to take place we need the NPV condition to be satisfied

$$\text{Value added} \geq \text{Transfer fee} \geq \text{Value lost}.$$

Using the conditions we then found that there is no obvious, unique solution in this three-party transfer market, the transfer fee and salary need to be decided through, e.g., negotiation, and we defined the negotiation intervals. In the words of Rubinstein (1982):

[...] the agreed contract [here: transfer fee] is individual-rational and is Pareto optimal; i.e. it is no worse than disagreement, and there is no agreement which both would prefer. However, which of the (usually numerous) contracts satisfying these conditions will be agreed? Economists tend to answer vaguely by saying that this depends on the 'bargaining ability' of the parties.

In the simple, stylised example we have presented thus far, we can use Rubinstein's bargaining model (Rubinstein, 1982) to find a solution to the negotiation, i.e., what the transfer fee will be.

2.1.2 First attempt at bargaining

Rubinstein describes a bargaining situation where two parties have to agree on the partition of a pie. For illustration purposes we will assume that the player's salary has already been decided. The parties, buying and selling club, know the size of the pie and they know each other's bargaining cost, i.e., there is full information. In our example, the pie is simply the present value of the buying club less the transfer fee that gives the selling club a net present value of zero (the minimum transfer fee (see figure)). Further, they have to agree on a

partition. That is, the transfer has to take place. If they agree on the minimum transfer fee, the BC will get the maximum NPV that satisfies the NPV condition and the SC will get a NPV of zero. If they agree on a higher transfer fee (a lower transfer fee will violate the NPV condition) the NPVs adjust accordingly.

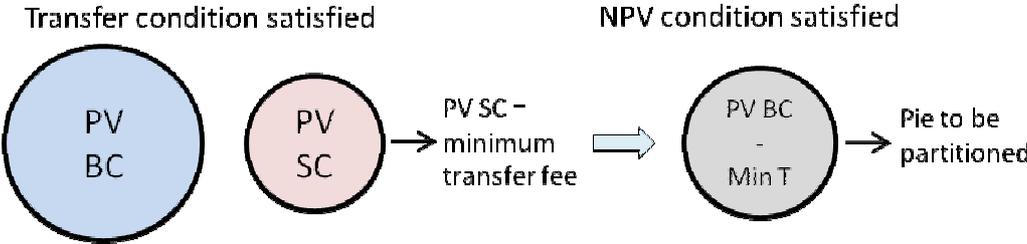


Figure 2 Selling club’s PV of the transfer is minimum transfer fee

First the BC comes with an offer and then the SC decides whether to accept or reject that offer, which leads to either an agreement or a new bargaining round with a counter offer from the SC. According to Rubinstein, the outcome of this bargaining depends on the bargaining costs of the participants and who makes the first offer because the two participants incur bargaining costs each round they have to bargain. Here we will assume that the clubs have fixed bargaining costs each round. Rubinstein also describes the situation where the participants have fixed discounting factors instead of fixed bargaining costs but we will not use that approach here.

One can think of many different costs that make up the clubs’ bargaining costs. For the buying club which we assumed had financial slack, costs could be lost revenue due to not performing well without the player. This cost is fixed for every round they have to play a match without that player. For the selling club it could be unnecessary salary expenses or, as is sometimes the case nowadays, financial distress costs. So let us assume the SC has higher bargaining costs than the BC. In Rubinstein’s model, then, the BC gets the whole pie, i.e., they pay the minimum transfer fee and maximises their NPV. The SC gets zero in NPV. The rationale behind this is that bargaining is a non-cooperative game, and the BC can offer the minimum transfer fee each round until the SC has incurred so high bargaining costs that they will lose no matter how big slice of the pie they get. (Remember that they have to agree on a partition.) It would therefore be better for the SC to accept the first offer from the BC and get the minimum transfer fee and NPV=0.

If the BC has higher bargaining cost than the SC, the bargaining model’s perfect equilibrium partition is given by the BC offering SC’s bargaining cost in the first round and the SC

accepting it. That is, the SC will not be able to come with a counter offer before rejecting the first offer, and therefore the highest NPV the SC is able to get is an NPV of the whole pie less one round of bargaining costs. The BC knows this and will therefore offer the bargaining cost of the SC in the first round.

This completes our model in the simplest case, with three participants, full information and no uncertainty.

2.2 The more realistic case

Now, let us make the transfer market more realistic and interesting by introducing more parties and make some interesting observations. By doing so, we will be able to form the basis of our to-be-developed pricing framework. First we will generalize the NPV condition for the buying club:

$$NPV_{BC} = IR - \{\text{costs the club incurs because of the transfer}\} \geq 0$$

So, what are these costs the club incurs? We have already mentioned two important ones – transfer fee and salary. Others include financing costs, player development costs, legal fees, bargaining costs, consultant fees and taxes, and these all drive down the NPV of the transfer. For the selling club it will be opposite. If they sell the player they will be able to save salary, financing and player development costs. Formally:

$$NPV_{SC} = T - DR + \{\text{costs the club saves because of the transfer}\} \geq 0$$

(You may have noticed that we have not considered the cost of identifying the player. That is because we consider scouting for players an activity the club would have done anyway.) Some of the costs are decided through negotiation whereas others are obviously not negotiable. The parties which have negotiable costs (NC) have to negotiate with the club – and possibly each other – for the remaining piece of the pie after the non-negotiable costs (non-NC) have been subtracted:

$$IR - \{NC \text{ ex } T\} - \{\text{nonNC}\} \geq T \geq DR - \{\text{costs}\}.$$

Which is just a generalisation of:

$$\text{Value added} \geq \text{Transfer fee} \geq \text{Value lost}.$$

Increased revenue (IR), non-negotiable costs (non-NC), decreased revenue (DR) and the costs the selling club saves are known sizes in the sense that they do not have to be negotiated. Focusing on the negotiable costs we can write the buying club's NPV condition like this:

$$NC \leq IR - \{nonNC\}$$

This creates the bargaining situations we mentioned earlier and their outcomes depend on the negotiating power of the participants, as showed with Rubinstein's model (Rubinstein 1982), and external factors. Examples of participants and factors are:

- Participants
 - The player
 - The selling club
 - All the clubs that want to acquire the player
- External factors
 - Tax regime, labour market legislation and general legislation
 - Similar players/substitutes players
 - Financing costs and other transaction costs (e.g. agents)
 - Currency, cultural and climate differences

Without going into too much detail now – we will cover this later – we can give some clarifying examples. If there are many clubs interested in the player this will increase the bargaining power of the selling club and drive up the transfer fee to a level higher than the minimum or NPV maximising transfer fee for the buying club. If the personal taxation in one country is lower than in another country the club with the less favourable tax system has to offer a higher salary than the minimum or NPV maximising salary. If there are many substitute players this will put an upper boundary on the transfer fee. An illustrating graph may give some useful insight.

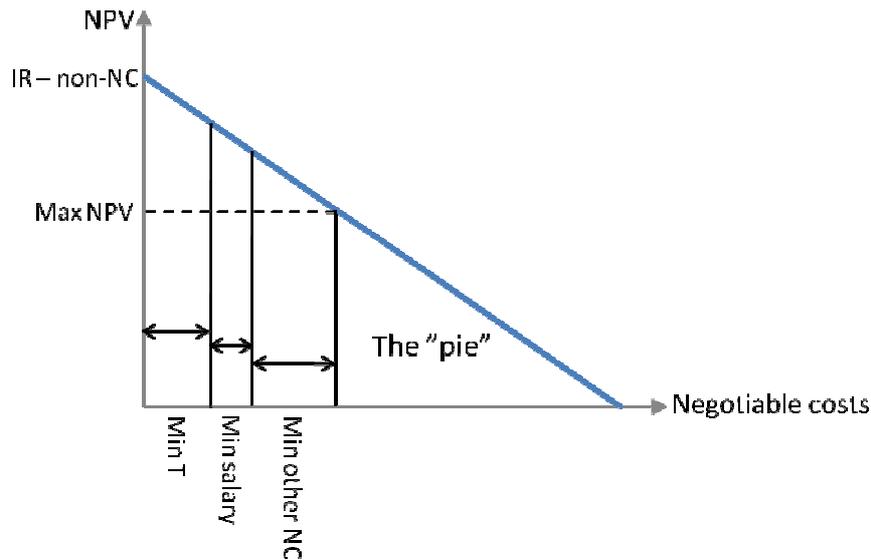


Figure 3 Identifying maximum NPV

The parties will then bargain over the area marked “The ‘pie’”.

It is time to end our introduction, and we do so with a repetition of our research topics: What value can a player add to a football club; and, how much will the club have to pay for that player? Hopefully these questions have been motivated somewhat by the fairly simple models we have created thus far. We have established that football players can add value to the club and that it is possible to quantify the value created by each football player. Further, we have taken a first attempt to describe the mechanisms that decide the negotiable costs. Also, we have learned important relationships, such as the transfer and NPV conditions and the variables that constitute them, and we have described, in an easy way, how the transfer market with its participants works. This knowledge will be important in the continuing: We will show you that the NPV and transfer conditions rarely hold in today’s football. To understand why this happens we need to explain how the owners of the clubs act, a side of the football world we have not discussed yet, and how the transfer market works, in more detail.

3. The economics of football and the labour market

“The challenge for economic theory is to find a dynamic balance between love and money necessary to analytically grasp the passionate and pragmatic complexities of the beautiful game” (Vrooman, 2007a).

Until now we have assumed, without stating it directly, that club owners are concerned with profits, but as this quote suggests, the world of football is different from the “normal”

business world. Players are earning millions of Euros every year and the need to maintain club reputation and satisfy fans is extremely important for the owners of the clubs: in the supporters' point of view, the winners in football are the teams that win most matches, not the teams that earn most money. The competition to sign the best players is fierce, which is reflected by the gross spending in the transfer market: E.g. the top division clubs in England, Italy and Spain spent a total of £850m on new players in the summer of 2010, before the new season started (Deloitte, 2010). Accordingly, we will therefore devote some time to explain how the football clubs act and how the labour market in football works, so we can develop realistic models for determining the transfer price and other entities.

3.1 Models for football club behaviour

3.1.1 Rationality and profit maximisation

One of the first formal analyses of the economics of sports was done by Rottenberg in 1956 where he studied the labour market, product market and factors determining demand and competition in American baseball. An important insight from this article is the necessity of uncertain match outcome, called the uncertainty-of-outcome hypothesis (Rottenberg, 1956): “uncertainty of outcome is necessary if the consumer is to be willing to pay for admission to the game.” He therefore claimed that the wellbeing of the whole league depends on no one team becoming too dominant, i.e. buying up all the player talent and thereby removing the uncertainty of outcome driving consumers away. The clubs are aware of this so player talent will be allocated just as efficient under a free market system (players are allowed to seek employment where they want) as under the reserve clause system (a system of transfer fees, which is the case in football). This result is called the invariance proposition. To reach these conclusions Rottenberg makes some assumptions that later have been questioned by several authors (Sloane, 1969; Carmichael and Thomas, 1993; Szymanski and Smith, 1997; Gerrard and Dobson, 2000). The first assumption is that (baseball) team owners are rational profit maximisers: “A rational team will seek to maximize the rent it derives from each player” (Rottenberg, 1956). Combining profit maximization with the requirement of uncertain match outcome gives an interesting result: the relationship between revenue and number of star players turns negative at some point. Consequently, at some point, a poor team will value a star player higher than a rich team, making it able to purchase that star player. The profit maximizing solution will then be a scenario where the clubs are nearly equal; in fact they have to be equal in order to have a sustainable league. However, equally sized clubs is

certainly not the case today; nevertheless, Rottenberg is honoured as the father of sports economics (Fort, 2005), and in our opinion, rightly so.

3.1.2 Win at any cost vs. sustainability

A model made especially for football, were developed by Sloane (1969). He recognizes Rottenberg (1956) but argues that the football club is a utility maximiser – not a profit maximiser – subject to a solvency constraint. This is, to some extent, also the view of other authors, e.g. Szymanski and Smith (1997), Gerrard and Dobson (2000) and Garcia-del-Barro and Szymanski (2009): They point out that the ownership and control structures of the clubs, amongst other things, determine how much weight the clubs put on profits and performance. We can think of other important factors that cause non-profit maximising club behaviour, such as demanding fans and wealthy owners only interested in sporting results. Examples are abundant of fans requiring new and better players and owners willing to win at any cost. This forces the owners of the clubs to focus mainly on sporting performance and satisfied supporters, and they will tend to maximise a combination of these factors. Not surprisingly, this behaviour will cause the NPV condition to break down on many occasions, even the transfer condition can be violated. Using the insight from figure 1, we will see transfers going through not only in area 3 but also in the other areas. An example may clarify this: A below top-tier club is bought up by an oil sheik wanting to create a trophy-winning team at any cost. To do this he will have to make huge investments in better players and we will see transfers going through in area 1. That is, the sheik's relatively small club buys quality players from the biggest and best teams in the world. Facing this new threat, established top teams, not willing to give up their positions as top teams and loose revenues, have to improve their player material. In competing for the best players the transfer fees and wages are bid up, making transfers occur in area 2 of figure 1. This inflation in transfer fees and wages also affects the smaller teams in their pursuit for players, forcing some of them into financial difficulty. The need to sell off players in order to avoid bankruptcy manifests itself in transfers going through in area 4.

Of course, there are owners out there who want to run their clubs in a sustainable and self-financing way, focusing on “area 3 transfers”, but the fierce competition from other clubs with different motives, i.e. win at any cost, force these clubs to act in (somewhat) the same way because all clubs compete in the same environment. The result of this environment has been high inflation in transfer fees and player wages, devastating the clubs' finances forcing many owners to subsidise losses every year (Drut and Raballand, 2010). UEFA, the European

football association, has taken steps to reverse the money gallop in football and make it a sustainable industry, with its Financial Fair Play rules (UEFA, 2010a and 2010b). These rules will be phased in from the 2011/2012 season so we are bound to see some changes in the coming years. By not allowing owners to subsidise losses year after year UEFA hope growth in wages and transfer fees will normalise, and that the financial playing ground between clubs will even out. Without going into too much detail, one of the demands is that clubs break even with relevant income and expenses:

Relevant income is defined as revenue from gate receipts, broadcasting rights, sponsorship and advertising, commercial activities and other operating income, plus either profit on disposal of player registrations or income from disposal of player registrations, excess proceeds on disposal of tangible fixed assets and finance income. It does not include any non-monetary items or certain income from non-football operations.

Relevant expenses is defined as cost of sales, employee benefits expenses and other operating expenses, plus either amortisation or costs of acquiring player registrations, finance costs and dividends. It does not include depreciation/impairment of tangible fixed assets, amortisation/impairment of intangible fixed assets (other than player registrations), expenditure on youth development activities, expenditure on community development activities, any other non-monetary items, finance costs directly attributable to the construction of tangible fixed assets, tax expenses or certain expenses from non-football operations. (UEFA, 2010a)

However, the clubs are given a yearly acceptable deviation in the break even result of €30m to €45m until 2018, to soften the transition period. Confront the report (UEFA, 2010a) for more details, it is an interesting read. In our eyes, UEFA is being way too nice.

3.1.3. The football club as a revenue maximiser

Club behaviour will probably not change because of stricter financial regulation (as we just showed, it is not strict at all!). Owners will still want to maximise number of wins and fan satisfaction but the Financial Fair Play rules will work as a limit on how much they can spend: In the future, the NPV condition cannot be violated anymore, at least not in the same degree as before. We predict – acknowledging the pitfalls – that “area 3 transfers” (see figure 1) will be the norm in the future. Until that “future state”, however, we need to rewrite our NPV condition:

$$NPV_{BC} = IR - \text{nonNC} - NC \geq \text{Lower limit}_{BC}$$

$$NPV_{SC} = T - DR + \{\text{costs}\} \geq \text{Lower limit}_{SC}$$

Note that “lower limit” is team specific and that our previous, neat, relationship no longer holds:

$$\textit{Value added} \not\geq \textit{Transfer fee} \not\geq \textit{Value lost}.$$

However, we will use our previous relationships for analytical purposes as they offer a great deal of insight.

Formally we can express club behaviour like this:

$$\begin{aligned} &\text{Max } F(\text{Winning, supporter satisfaction}) \\ &\text{subject to} \\ &\text{Break even result (as defined by UEFA)} \geq \text{lower limit} \\ &\text{and other club specific constraints} \end{aligned}$$

One is tempted to say that maximising wins will also maximise fan satisfaction, but we want to preserve the possibility that fans have other wishes than solely to maximise winning: For instance to play aesthetic football, to have players from their home country, to have a club that is run in a financially sustainable way, etc. Szymanski (1998) supports our view stating that having supporters and recruiting new supporters is important for any football team, also in a financial sense. Potential supporters are likely to choose strong brands instead of less well-known brands, and that the decision will be influenced by what teams are popular at that time. Hence, owners of strong brands and popular teams – as well as owners of less popular teams – have incentive to maintain and improve the club’s image, and assembling a team with popular and good footballers is likely to do so.

For modelling purposes we will assume that maximising wins (performance) and fan satisfaction is the same as maximising revenue. This is an assumption easily defended. Barajas, Fernandez-Jardon and Crolley (2005) found sports performance to explain the main revenue streams for Spanish professional football clubs, so winning more games give higher revenues. Performance’s effect on revenues is also shown with the economic impact of being relegated or promoted from a division: “The mean revenues for English Premier League teams in the sample is about £28 million, the mean revenues for English Division One teams is only about £6 million, and mean revenues for English Division 3 is a mere £1.5 million”

(Amir and Livne, 2005). For a football club in the top French division, Ligue 1, to be relegated to Ligue 2 means on average an 80% loss of revenue (Drut and Raballand, 2010). Blackpool Football Club (an English Premier League club) manager Ian Holloway claimed his star player Charlie Adam could be worth “£46m” when you consider the opportunity cost of relegation (guardian.co.uk, 21.01.2011). All of these examples illustrate the close relationship between performance and revenue and how important performance is for revenue.

The other part of the object function, supporter satisfaction, concerns the customers of the club. Many clubs have fans all over the world, either following the club on TV and internet or live at the stadium. So pleasing fans is essentially the same as pleasing your customers, and happy customers are buying customers. Whether it is increased sales of stadium tickets or merchandise, or more people viewing the match on TV, satisfying fans has a clear effect on the revenues of the club. We will elaborate on the clubs’ main sources of revenue and how a player can affect them, shortly. Our model for club behaviour is now done. We can express it like this:

Max Revenue

subject to

Financial constraints

Other club specific constraints

This simple model can help explain clubs’ behaviour in the transfer market; they will seek out players that increase performance and/or increase fan satisfaction because this will increase, or maximise, the club’s revenue. In the first part of our thesis we will therefore create a framework for identifying which revenue sources a player can affect and how he can affect them, this is the Increased Revenue (IR) variable in the NPV condition. Then we will try to quantify IR in money terms – recognizing the uncertainties concerning a player’s revenue generating abilities – with stochastic modelling. Once this is done, the transfer price and wage have to be decided (and other costs as well), and even though the clubs act as revenue maximisers – not profit maximisers – there is no reason to believe that they want to pay more than they have to, in player wage and transfer fee. We will therefore create a framework for how these sizes can be decided. And that is it. At the end we will hopefully be able to answer our research topics: What value can a player add to the owners of the club; and, how much will they the club to pay for that player?

Before we start to answer our research topics we need to elaborate on one more side of the football world, namely the labour market.

3.2 The labour market

It is necessary to explain how the labour market, hereunder transfer market, work in professional football in order to describe how transfer fees and player wages are determined. The most visible difference from the “normal” labour market is that football players can not quit their “job” as easily as a worker in a company. Football players are bound to a club with a contract. However, in the last 60 years the labour market has changed markedly, giving more freedom and power to the players. Following Sloane (1969): up until 1961 the transfer market had similar characteristics of a slave market, there was a maximum wage and unless the club agreed to sell a player, he was bound to that club for as long as they wanted him – a so-called retain and transfer system. In 1961 maximum wage was abolished and in 1963 the retain and transfer system was altered somewhat, but a transfer fee would still have to be paid if the club wanted so: “The retain and transfer system is therefore the linchpin of the football labour market, and despite many years of pressure by the union, its basic tenet that a club has the right to claim a fee for the loss of service of a player remains intact” (Sloane, 1969). The function of this system was to prevent too big differences between clubs, i.e. concentration of star players in a few clubs. Under the retain and transfer system, smaller clubs were guaranteed financial compensation (a transfer fee) for their players if bigger clubs wanted them. This, it was argued, gave incentive to train and develop player talents because the clubs were certain to be compensated for their investments in player development.

3.2.1 The Bosman ruling

A verdict by the European Court of Justice in December 1995, however, ended the prevailing retain and transfer system, at least in the EU which is the biggest football market. The verdict popularly referred to as the Bosman ruling, states that article 48 of the EEC treaty also applies to football (Judgment of the Court of Justice, Bosman, Case C_415/93, 15 December 1995). This ruling meant that football was to be considered an economic activity and therefore subject to the provisions of the treaty of Rome regarding freedom of movement. In practice, this gives a football player whose contract is expired the right to seek employment wherever he wants, without the club getting any compensation. This, as already explained, was not the case before the Bosman ruling; before, the clubs would get compensation when losing out-of-contract players. Another implication of the Bosman verdict was that clubs in the EU could employ and use as many EU-citizens, and citizens from nations with agreements with the EU

(e.g. Russia and Norway), as they wanted; before the verdict they could only use up to three foreigners. Citizens from outside the “Bosman area”, however, are still subject to national regulations which can differ from football association to football association, and these regulations are, in general, more restrictive:

For instance, Germany adopted sport specific rules (Arbeitsaufenthalteverordnung amendment) stipulating that work permits will be issued exclusively to non-EU foreign athletes which will play for teams in the respective highest league in each sport. In France, players must have at least one International cap. In the UK, a player must have performed in 75% of the internationals in the last 2 years for which his country have played and the country must be in the FIFA Top 70. (Osselaer, 2008)

We will come back to the Bosman verdict’s implications on transfer fee and player wage later.

3.2.2 General regulations from FIFA

More general regulations are given by FIFA, the international football association. The FIFA Regulations on the Status and Transfer of Players (FIFA, 2010) states that:

Players may only be registered during one of the two annual registration periods fixed by the relevant association. [...] The first registration period shall begin after the completion of the season and shall normally end before the new season starts. This period may not exceed twelve weeks. The second registration period shall normally occur in the middle of the season and may not exceed four weeks.

This means that the transfer market is only open two times a year, so-called transfer windows. For the big leagues (England, Italy, Spain, Germany and France) the transfer window is open in July, August and January. Thus, players may only change club two times a year. Further:

A contract between a professional and a club may only be terminated upon expiry of the term of the contract or by mutual agreement. [Or] A contract may be terminated by either party without consequences of any kind (either payment of compensation or imposition of sporting sanctions) where there is just cause. (FIFA, 2010)

Needless to say the transfer market is not frictionless; clubs are not allowed to sign players whenever they want, and neither club nor player is allowed to unilaterally terminate the

contract without just cause. Established professionals may, however, under some circumstances terminate their contract:

An established professional who has, in the course of the season, appeared in fewer than ten per cent of the official matches in which his club has been involved may terminate his contract prematurely on the ground of sporting just cause. (FIFA, 2010)

Further, clubs are not allowed to offer contracts with contract length above 5 years, and for players under the age of 18 the maximum contract length is only 3 years.

If a contract is terminated without just cause the breaching party have to pay compensation for training expenses, and in case the player is the breaching party he is suspended from playing professional football from four to six months. If a new club signs such a player, it will be suspended from the transfer market the next two transfer windows. This was the case when Chelsea FC, an English Premier League club, signed French super talent Gaël Kakuta from French top division club, RC Lens (Gibson, 2009). FIFA accused Chelsea of inducing the young Frenchman to break his contract with RC Lens without just cause. Consequently, Chelsea was banned from the next two transfer windows, Kakuta was banned for four months, and they both had to pay fines and compensation to the former club for training and development expenses, totalling €910.000. The transfer window ban was lifted, however, after Chelsea appealed the ruling (BBC.co.uk, 04.02.2010) and the two clubs and the player agreed that Kakuta's contract with RC Lens was invalid. This brings us over to another topic: the process of *how* a player is transferred.

3.2.3 The transfer from A to Z

In Sanghera (2007) there is an interview with a football agent explaining all sides of the transfer process. We will draw heavily on the insight from that interview but present it in a different way, more suiting for our purpose.

Basically there are three types of scenarios that trigger a transfer:

1. Interested club(s) approach current player's club
2. Current player's club approach other clubs because they want to get rid of a player
3. A player is out of contract and in search for a new club

The only procedural difference between the two first transfer triggers is who makes the initial contact: buying or selling club. Apart from that, the process is the same: first the clubs have to

agree on a transfer fee; then the personal terms are negotiated between buying club and the player. If one of these processes break down there will be no deal and no transfer. Note that the transfer fee negotiation is a process which does not include the player; in fact, it is illegal for a club to contact the player directly – a process called “tapping up” – and it may result in heavy fines (Fletcher, 2005).

Once a transfer fee has been agreed upon – a negotiation process which can take a long time – the club and the player have to agree on the personal terms. Often an agent will assist the player in this process.

Professional and financial issues will be taken into consideration such as: whether the player is going to play, the wage and the length of the contract. It is a bit of negotiation and compromise. The agent wants to realise a player’s value to a club while the club will be looking to minimise their outlay as much as they can. [...] If a number of clubs have agreed a fee for a player then he will weigh up a number of aspects. These may include whether he is going to play more at one club than another, the package he is getting and how much he will have to uproot his family. It often comes down to a wide range of reasons but for most players, first and foremost, it can be about how many minutes on the pitch they are going to get. (Sanghera, 2007)

Both of these negotiations can take place outside the transfer window described earlier, but the player cannot move to the new club before the transfer window opens.

The third transfer trigger, concerning out-of-contract players, is the Bosman ruling in practice. A player is out of contract for two reasons. 1) The club chooses to not renew the contract; or 2) The player does not accept a new contract proposal. There are several examples for both of these reasons, but normally it involves the player being unwanted or the player wanting to move. Either way the player is free to join any club he wants, granted that *that* club also wants him and offers him a contract.

3.2.4 Loan, option to buy, performance clause in transfer fee, third-party owners

What we have learned thus far about the labour market, i.e. regulations and practices, enables us to understand the majority of player transfers, and it is almost sufficient for our purpose: after all, this is not a study of the football labour market per se, but we need a good understanding of it to perform our analysis. So, as the headline suggests, a transfer deal can take several forms and who receives the transfer fee is not always straight forward.

Loans describe a situation where a player temporarily changes clubs: “A professional may be loaned to another club on the basis of a written agreement between him and the clubs concerned. Any such loan is subject to the same rules as apply to the transfer of players” (FIFA, 2010). This written agreement states the duration, normally from six months to a season but not shorter than the time between two transfer windows as players cannot change clubs outside the transfer windows; possible fees to be paid (these fees are less than the would-be transfer fee in case of a permanent transfer); and how the salary expense is shared: The player’s salary does not change since he still has the same contract, but the clubs can decide which is to pay the salary – owner, borrower or a combination. There can be several reasons why a club prefer a loan to a permanent transfer: Borrowing a player can help clubs without transfer funds to acquire quality players because they only face (possible) wage expenses; the possibility of lending a player short term can help a club with injury problems to replace injured players. These are win-win situations if the lending club does not need the player for a period, but does not want to sell him permanently, because they can save wage expenses. At the same time, the player will get playing time and gain experience at the borrowing club, which can help develop his skills and prepare him for play at the lending club in the future. This is often the case with talent development when a club’s talents are lent out to lower division clubs.

The flexibility of the loan, however, does not end there: it can be combined with an option to buy at the end of the loan period at a predetermined price. When Italian top division team AC Milan signed superstar Zlatan Ibrahimovic from Spanish top division team FC Barcelona, the clubs agreed that Ibrahimovic would be loaned for the 2010/2011 season, with AC Milan paying the whole wage and given an option to buy the player for €24 million at the end of the season (ESPN, 2010). When we discuss asymmetrical information later, the flexibilities a loan gives – with or without the call option – will be revisited.

As we have shown, the investment cost of acquiring new football players can be substantial. When you combine this with bad club economy which is the case for many – if not most – football clubs (Deloitte, 2010), the need to dampen the effect a transfer fee has on the club economy becomes necessary. Many clubs therefore prefer to pay the transfer fee over a period of time instead of paying everything upfront. E.g. pay half now and half in six months time or pay 80% now and the remaining 20% when the player has played 10 matches. In some countries co-ownership of players is normal, i.e. the player plays for one club but that club

owns the player together with another club. Another, controversial, option is to involve outside investors:

The practice of businessmen-investors "owning" players feels fundamentally repellent to English football but it is common elsewhere, particularly in Brazil and Argentina where so many brilliant players shine in a landscape of wrecked and insolvent clubs. Businessmen buy shares in the "economic rights" of young players, often paying initially for the players' training or accommodation, and then they are entitled to all or a big chunk of a transfer fee if the players do well and are sold on. (Conn, 2007)

Trying to reverse or suppress this practice, FIFA has laid down strict rules stating that no third party can influence a club's decisions (FIFA, 2010), i.e. change the club from being a maximiser of performance and supporter satisfaction. However, in principle we think third party ownership is an interesting way of financing and sharing the risks of talent development: The outside investor puts up the money for player development and gets the proceedings from (potential) player sales which he cannot influence; the manager runs the club and decides who plays, who is to be sold, etc. The legal framework is already there so the challenge is to enforce it.

We have now tried to explain how the labour market and transfer market in professional football work. The main point is that the transfer market is a highly regulated market place where neither players nor clubs can do as they please. Yet – or rather, consequently – it is a complex market offering a wide range of opportunities. For our paper, the most important lessons are those of the Bosman ruling, maximum contract length of 5 or 3 years, the requirement to fulfil a contract, how the transfer process works, and finally the different types of transfer and financing options. This knowledge will especially help us to explain the pricing mechanisms and differences in negotiation power between parties when it is time answer our second research topic: How much will the club have to pay for *that* player? First, let us focus our attention on the first research topic: What value can a player add to a football club?

4. Research topic 1: What value can a football player add to a football club?

4.1 Possible valuation factors – identifying Increased Revenue (IR) and Decreased Revenue (DR) in the NPV condition

As we have already stated, the primary goal for a football club is to have sporting success and satisfy supporters. To achieve sporting success, a football club must develop and acquire talented players. Carmichael and Thomas (1993) describe the latter: “The primary motivation for the buying team when seeking to acquire a new player may be taken to be team strengthening aimed at achieving sporting success”. Hence, sporting success, at least long lasting, will come at a cost – the cost of investing in new players. And based on UEFA Financial Fair Play it is important for clubs not to incur losses on their investments. Amir and Livne (2005) explored the contribution investment in football players have on a football club’s revenues and operating profit. They found the contribution to be significant and positive, but it lasted for no more than two years. However, it was not in the paper’s nature to discuss why player investments have a positive contribution to revenues. It is important to find out why in our framework. Szymanski (1998) studies what revenue sources increased performance will affect:

As club performance improves, revenues grow as a result of increased attendance, higher ticket prices, increased sponsorship, merchandising and TV income. In fact, 82% of the variation in revenue between the clubs in 1996/97 could be explained simply by league position. The same relationship can be found when we look at the performance of clubs over time: higher revenues flow from higher league positions.

He also found that higher wage expenditure leads to higher league positions, because better players demand higher wages, and better players win more matches. Each revenue source mentioned in this article will be discussed later in this part of the paper. To make it more lucid we will focus on three main revenue sources for a football club: matchday revenue, broadcast revenue and commercial revenue (see Deloitte, 2010; Amir and Livne, 2005). How consumers contribute to these revenues and who the consumers are, is described in Mason (1999):

[a football club’s product] is now sold to four distinct groups: first, fans who support leagues by attending games, following games on television and other media, and purchasing league- and team-related merchandise; second, television and other media companies which purchase the right to show games as a programming option; third,

communities which build facilities and support local clubs; and fourth, corporations which support leagues and clubs by increasing gate moneys, purchasing teams outright, or providing revenues through sponsorships or other associations.

Szymanski (1998) has a theory of why fans support the teams they do. Having supporters and recruiting new supporters is important for any football team, also in a financial sense. Szymanski states potential supporters are likely to choose strong brands instead of less well-known brands, and that the decision will be influenced by what teams are popular at that time. Hence, owners of strong brands and popular teams have incentive to maintain the club's image, and assembling a team with popular and good footballers is likely to do so.

In this section, different factors for the valuation of a football player will be identified and discussed. Our view is that an investment in a player is like any other investment. For the investment to have a financial value, it must generate a cash flow. The present value of the cash flows, or revenues, will sum up to the investment's (here: the football player's) financial value. It is important to note that we only consider the footballer's contribution to the football club's revenue, and not revenue the player might generate to himself in the wake of the transfer. If a footballer can produce a positive contribution to a football club's revenues, he will have a financial value to the football club.

We will present and go through each of the three main revenue sources (matchday revenue, broadcast revenue and commercial revenue), and describe how our two factors, 'increased performance' and 'fan appeal', affect these revenues. Note that the factors will affect all three revenue source.

4.1.1 Matchday revenue

Matchday revenue is largely derived from gate receipts including season tickets and memberships. In the 2008/09 season, the twenty biggest football clubs in Europe, measured by total revenues, had total matchday revenues of €1 billion contributing 26 % of total revenues, and they had an average capacity utilisation of 87 % in their arenas (Deloitte, 2009 & 2010). These numbers underline the importance of matchday revenues for the football clubs. They also describe the potential for increased matchday revenues, either by higher capacity utilisation or by expanding the capacity (the capacity utilisation varied from 58 % to 100 % for the twenty football clubs).

The most direct way football players can affect the matchday revenue is by attracting more spectators to the football club's stadium. Our two factors explain how this can be achieved.

4.1.1.1 "Fan appeal"

This factor will describe player specific aspects that can increase attendance on matchday. We assume increased attendance will increase the matchday revenue.

69% of the European football fans say that their identification with and affiliation to a team is largely determined by the particular players the team engages (Brandes et al., 2007). Carmichael and Thomas (1993) state that a football club need to maintain a fairly stable team over time to retain consumer brand loyalty. These statements are fundamental for our "fan appeal" factor. It underlines the importance of assembling a team with the "right" type of players, and holding on to them, for the existing supporters to maintain their interest in the football club but also to attract new supporters. It also underlines the importance of avoiding poor investments, i.e. unpopular or disliked footballers. We find it reasonable to assume that interest in the club and its players is an important reason supporters visit the stadium on matchday. The term "supporter" in this context is interpreted as every person interested in visiting the stadium and buying a ticket to watch the team perform.

There are only two types of players in the description of the "fan appeal" factor: a player either has fan appeal or a player does not have fan appeal. How much fan appeal the player might have is not important in this part of the paper, the importance here is that it exists and that it has a potential financial value for the football club. For this factor to exist, a player must have some special attributes. Literature on players with fan appeal, or "superstars", suggests two main ways that stars attract fans: by outstanding talent and exceptional performance, and/or by remarkable popularity (Adler, 2006; Rosen, 1981). Only players with fan appeal have one or both of these attributes. Note that the performance of the team itself is not commented upon. The focus here is that one single player, a star, can attract fans, regardless of the team's – and to some extent the star's – performance.

Other literature supports this statement:

[...] outstanding players – so-called stars – play an important role in attracting fans (Brandes et al., 2007); A superstar can have an effect on the revenues of his own team beyond simply improving team quality. The superstar may have a "personal appeal"

that attracts fans even after controlling for his team's (increased) quality (Hausman and Leonard, 1997).

Mullin and Dunn (2002) found evidence in professional baseball that stars may influence gate revenues both by their talent which is translated into field success and by their popularity; stars attract fans and generate disproportionately high attendance by their outstanding performance (Rosen, 1981); fans of team sports may respond to aesthetic athletes (McDonald et al., 2002); fans are likely to be attracted to contests with high-quality displays of skills (Borland and Macdonald, 2003). Some of the studies are on different sports than football, but we assume sport fans to have similar behavior.

We can divide the “star” term into two categories: the kind of star that increases attendance only at matches played at home, a “local hero”, and the kind of star that increases attendance both at matches played at home and away (see e.g. Brandes et. al, 2007; Hausman and Leonard, 1997). If the latter represents an extra source of revenue, i.e. the football clubs share the gate revenue, it should be taken into consideration when valuing the football player. As an example, the English Premier League does not share gate revenue, while the National Football League (USA) shares the gate revenue 60/40 for home and away team (Simmons and Robinson, 2009).

4.1.1.2 Increased performance

Scully (2004) found that in Major League Baseball “the marginal revenue of a 0.001 point change in the win percent is \$60,958 in 1990 and \$200,160 in 1998”. This is a good example on how increased performance can increase a sport club's revenue. However, it does not say which revenues are affected and why. We will now describe how a team's increased performance can lead to increased matchday revenue. Increased performance includes one or more of the following three aspects of a football team: (higher) ranking, (more) wins and (more) entertainment. Ranking and wins are direct consequences of increased performance, and are easily observed. Entertainment, on the other hand, might be a bit more subjective from the supporters' point of view. We argue that increased performance will lead to a higher quality of display, and thus increasing the entertainment value. Supporters might also find more wins to be entertaining in themselves. There can be a number of ways increased performance can be achieved. We will focus on the case in which a football club enters the transfer market and invests in new players to increase team performance. The new players can increase team performance on their own, or “alternatively, their style may give them the

capability to raise the play of the rest of the team as a unit, a species of externality” (Carmichael, Forrest and Simmons, 1999). Note that these players are expected to have a non-negative contribution on the team’s performance: if the investment turns out to be poor (i.e. the player has bad performances) the player will simply not be used and thereby not affect team performance. This can be viewed as an option, with the player’s performance as underlying. If the performance is good enough, the option will be “exercised”. Note also that these players do not necessarily have to be “superstars”. Most players are not superstars, but they can still have a positive contribution on the team’s performance.

Increased performance (ranking, wins and entertainment) can lead to increased matchday revenue in three ways: more spectators in the stadium, more matches and higher ticket prices.

The first is based on an assumption that increased performance will at least not lower the number of spectators and it will boost the probability of more spectators. So, our assumption is: on average, increased performance will increase the number of spectators in the stadium. Dobson and Gerrard’s (2000) paper on a theoretical model for transfer fees support this assumption. In Borland and Macdonald’s (2003) paper on demand for sports, they found “overwhelming evidence that attendance is related positively to home-team performance”. The latter (more matches) is based on the fact that the best team(s), based on league position at the end of the season, can get the opportunity to qualify for international competitions. The teams who qualify will have more matches than its national rivals who do not qualify, as the international competitions are in addition to the national competition(s).

As a consequence of increased performance a football club can raise its ticket prices the following season. Atkinson, Stanley and Tschirhart (1988) found that “as a team wins more often, owners have been able to raise average ticket prices to increase gate receipts without reducing attendance”. They went on to quantify this effect, stating:

Improving a season record by one win allows an owner to increase average ticket prices by \$.12. Given the NFL [National Football League in the US] average stadium size and eight-home-game schedule, one added win increases the next season's receipts by \$62,155.

Increased performance can also have spin-off effects such as increased common interest in the team and its players. We postulate that this effect can lead to a bigger supporter base, and increase the probability for more spectators at the football club’s stadium. Consequently,

increased performance can lead to higher attendance through higher interest from existing supporters and a potentially bigger supporter base, more matches and eventually higher ticket prices. Andreff and Szymanski (2006) found that duration of league membership is a significant determinant of base attendance, suggesting that teams which have kept their league membership, and not been relegated, enjoy higher attendance. This result highlights the importance of not being relegated, but also the financial benefit of establishing a newly promoted football club in its new league. Note that ‘increased performance’ does not necessarily imply a relative high league ranking; it can also imply the fact that some football clubs must increase their performance to not be relegated. To illustrate the economic impact of being relegated or promoted, see page 15-16.

So far we have assumed that increased performance will lead to higher attendances and with that increased matchday revenue. This assumption implies that the revenue response to wins is elastic, meaning that fans, through attendance, will punish the club for losing and reward it for winning. Porter (1992) explains this through his ‘fickle-fan’ proposition:

Seen in this light, fans have a large stake in determining the quality of the team, not by being loyal, but by being fickle. The more elastic the attendance response to wins, the greater the incentive of the owner to field a winning team.

If the response is inelastic, the owner of the football club has little incentive to assemble a winning team, making increased performance an insignificant factor on matchday revenue. Hence, the elasticity in attendance response to wins is important for our ‘Increased performance’ factor in this section.

4.1.2 Broadcast revenue

Broadcast revenue includes revenue from both domestic and international competitions. In the 2008/09 season the twenty biggest football clubs in Europe had a total of €1.6 billion in broadcast revenues, contributing 42% to total revenues (Deloitte, 2010). The broadcasting deals are either negotiated between the broadcasting network and the football clubs themselves, or by the national football federation. Attracting attention from the media and the broadcasting networks can be a lucrative business for football clubs, as the numbers above highlight.

The development in satellite television, the Internet and other technological advances have “delocalised” sports. Mason (1999) describes the consequences of this “delocalisation”:

[...] the global marketplace has made sports less attached to specific places, particularly those which have world-wide appeal, such as football and basketball. In effect, fans of professional sports can follow the exploits of their favourite teams or leagues despite the fact that they may be operating out of cities in other parts of the world (the global following for Manchester United), especially those teams that feature local athletes playing abroad (the Irish following for English Soccer Clubs such as Manchester United, Liverpool and Arsenal). Satellite television, the Internet and other technological advances can only hasten the process of delocalisation within the European sporting community.

This effect will also affect commercial revenue, as delocalisation of football will lead to a bigger and broader audience, but more on this under 'commercial revenue'. A bigger audience will shift the demand curve for broadcasting rights for football up. The supply of football matches is fixed, as there are a fixed number of games and football clubs per season. This will lead to a higher price for the broadcasting rights, increasing the broadcast revenue. Greater television viewership will also translate into more expensive advertising time, reinforcing the competition for the broadcasting rights and bidding the price up (Atkinson, Stanley and Tschirhart, 1988). The development in the price for broadcasting rights support this statement: In 1992, a 5 year deal for the television rights of the English Premier League was sold for £191 million. From 2007-2010 the deal was sold for £1.7 billion (see e.g. Premier League, 2011).

4.1.2.1 "Fan appeal"

Hausman and Leonard's (1997) study on basketball games' TV ratings give strong evidence of a positive superstar effect. This superstar effect is also present when controlling for the teams' quality. So, if a football club has a superstar in the squad, it could experience more televised matches, because matches with superstars attract higher viewership, and thus higher broadcast revenue.

Manzenreiter (2007) follow up on the "delocalisation" described by Mason, stating: "Since satellite TV has turned European football into Asia's sport of choice, club managers count on the growing interest in their club once Asian players have contracted." And, "Broadcasters successfully enlarged their subscriber base in line with the global movement of local star players, while the inflated audiences increased the marketing value of the team." The local star players mentioned here is a new kind of stars, not yet defined in this paper. The criterions

of these stars are their (Asian) nationality, and their ability to attract interest from their country, region and/or continent. Investing in these kinds of stars is like investing in a derivative on the new (Asian) market. One of Liverpool FC's sponsors has made it clear they want the club to buy Asian stars, saying: "The markets in Asia and the Middle East are so nationalistic, they are very proud about their countries. One appearance from a player, say from Dubai in the Premier League, and you'd have the whole of Dubai watching it" (BBC, 2011). Such an event would likely boost both the broadcast and commercial revenues for a football club.

4.1.2.2 Increased performance

Simmons and Robinson (2009) describe how broadcast revenues are distributed in the English Premier League: "the broadcast revenues that accrue to the English Premier League are shared between clubs in a formula that includes a proportion of equal shares, a proportion dependent on finishing league position and a proportion dependent on the number of televised games." Of particular interest is the share of broadcast revenues generated by finishing league position and number of televised games. Football clubs can affect these shares by on-field performance, as high (increased) performance can lead to a high(er) finishing league position. Successful clubs will also get a bigger share of the satellite coverage, increasing the number of televised games (Baimbridge et al., 1995). The size of broadcast revenues depends on how much the television rights for the league is sold for, and that depends on the television viewership. The football clubs in the English Premier League can contribute to a favorable contract for the television rights by bolstering viewership through improvements in the quality of televised contests (Atkinson, Stanley and Tschirhart, 1988).

How increased performance affect the broadcast revenue depends on how broadcast revenue is distributed and negotiated in the competitions a football club participates in. The main idea, however, is that increased performance is likely to give a football club more televised games increasing broadcast revenue.

4.1.3 Commercial revenue

Commercial revenue includes sponsorships and merchandising revenues. In the 2008/09 season the twenty biggest football clubs in Europe had a total of €1.3 billion in commercial revenues, contributing 32% to total revenues (Deloitte, 2010). Multinational corporations use the popularity of sports, sport stars and sporting events as a marketing vehicle: "The alliance of sports and television was of crucial importance for targeting ever larger audiences, and the

capability of sport to reach transnational customer markets appealed to these corporations” (Manzenreiter, 2007). Manzenreiter sums up how corporations use football clubs as a marketing vehicle:

Nike turned out to be paying USD 400 million to the Brazilian national team for a four year period; cell phone companies such as Vodafone or Siemens paid USD 15,7 million and USD 20 million respectively to be uniform sponsor for European top clubs Manchester United and Real Madrid; most Austrian football teams are occasionally renamed according to their current main sponsor company (e.g. former Austria Memphis Salzburg became FC Red Bull Salzburg in 2005), the Yokohama Marinos, Arsenal London (from 2006) and Bayern Munich play their home games in the Nissan Stadium, the Emirates Stadium and the Allianz Arena.

The mentioned delocalisation of football has opened the gate for new consumers and supporters, and with that, opportunities for increased revenue. One way football clubs try to break into new markets is by arranging pre-season and promotional tours and matches in those markets. Instead of competing with established markets such as Spain and Italy, English football clubs can focus their attention on North America and Asia.

4.1.3.1 “Fan appeal”

Hausman and Leonard (1997) found that the presence of superstars will increase merchandising revenues. As an example, the superstar Michael Jordan and his team, Chicago Bulls, stood for half of the licensed merchandising income in the National Basketball Association (NBA).

The description of a player with ‘fan appeal’ includes, among other things, remarkable popularity. In this section remarkable popularity should be interpreted as the ability to attract new consumers. Remember that consumers in this context are fans, broadcasters and corporations. As mentioned in the introduction of this revenue source, corporations use sport stars as a marketing vehicle. If a football club buys certain stars, e.g. local stars from East Asia or worldwide stars, it will attract certain corporations dependent on the corporations target markets. We have already covered some aspects on how a star can attract fans. Also interesting in this context is how a football club can use its star(s) to attract new fans. After Real Madrid purchased the superstar David Beckham, they went on a promotional tour to Japan. It is reported that during the promotional tour the shirt sales in Japan alone covered

25% of David Beckham’s transfer fee (Manzenreiter, 2007). Even though this is an extreme case, it underlines the potential stars have on commercial revenues.

4.1.3.2 Increased performance

Commercial revenue can arise from multiple factors. It is likely that this revenue is based on a mixture of aspects such as a football club’s performance, history, players, fans, and the football club’s ability to attract more fans and reach new markets. The list is inexhaustible. However, we will focus on how a football club’s performance can affect the commercial revenue. “At the margin, fans and sponsors are attracted by success: so better performance attracts higher income” (Szymanski, 1998). In a sense football clubs are competing for commercial revenue, by trying to be successful. Increased performance might also trigger clauses in sponsorship contracts, due to for example more televised matches or qualification to international competitions.

4.1.4 Conclusion

We have now identified main sources of revenue players can affect and hence described the IR variable in the NPV condition. When looking for players, the clubs should therefore find out how different kinds of players affect these revenue sources. We have summarized this in a table:

	Matchday revenue	Broadcast revenue	Commercial revenue
Fan appeal	Popular players increase attendance	Popular players increase televised matches	Popular players increase sales of merchandise and attract sponsors
Increased performance	Good performance attracts more spectators. Can also raise ticket prices. More matches, sell more tickets	Good performance attracts attention from the media. More matches televised.	Good performance attracts sponsors and increase sales of merchandise.

Table 2 Valuation factors and affected revenue sources

For the football clubs to be able to increase their matchday revenue, they must fulfil some criteria: the football club must be able to handle increased demand, either through higher utilisation of the stadium, or expanding the capacity of the stadium, and/or it must be able to increase ticket prices. For the football club to be able to increase broadcast revenue, it must

have access to a technological infrastructure enabling increased viewership. In other words, the broadcaster with the rights to view a football club’s matches must be able to reach out to a relatively big and broad audience. To some extent this will also affect the football club’s ability to increase commercial revenue. For sponsorship deals, corporations want their brand to be exposed to a big audience. And merchandise sales will depend on the number of supporters, which is expected to increase with increased viewership.

In our discussion we have described four kinds of football players. Players either have or do not have fan appeal, and they either increase or do not increase performance. Below is a table summarizing the different kinds of players and their characteristics. This table can be used in combination with the table above to see what revenues sources a player is likely to affect, and how this player will affect the revenue source(s).

Player has fan appeal			
Yes		No	
Player will increase performance		Player will increase performance	
Yes	No	Yes	No
This is the superstar player, and is likely to affect all three revenue sources in a positive way.	Choose this player if increased performance does not matter. E.g.: this player has huge commercial revenue potential.	Choose this player if increased performance is the most important thing. E.g.: the club faces relegation or promotion, or the club can qualify for international competition.	This player will not increase revenues. Do not buy.

Table 3 The different kinds of players

4.2 The valuation model

With the valuation factor framework we are able to find out which revenue sources a player affects and how he can affect them. The next step is to quantify our findings from that exercise. We will do so by using our two factors – increased performance and ‘fan appeal’. Both factors include an element of uncertainty, as we cannot say for sure how a new player can affect our performance, or how popular and/or skillful the player will be in the new

football club. The two factors can also change over time: a young talent will give higher performance after some training, and he can also build up fan appeal throughout his career. Also, a new player might need time to adjust to his new surroundings, which can delay the impact a player is expected to have on the football club, like on-field and financial performance. This effect may also depend on the player's age: "Purchases of younger players with a promising future and high-value added potential involve longer-term considerations than those of older established players" (Carmichael and Thomas, 1993). Potential injuries the player might incur can also have an effect on these performances. Taking all this into consideration, problems of adverse selection and moral hazard may arise.

4.2.1 The case of asymmetric information in football

Carmichael, Forrest and Simmons (1999) discuss the cases of adverse selection in their paper on the labour market in football. They claim abilities and effort of individual players are "widely monitored and easily observable to a network of well-informed managers, coaches and scouts", eliminating the adverse selection problem. Note that this is not a case of moral hazard, as this describes the situation in the transfer market *prior* to the transfer. If a football club has a well-informed network, it should be able to map expected impact a new player can have on the football club, and also different sources of uncertainty, such as injury proneness and adjustment-period. However, there are also non-observable factors such as professionalism and personality off the pitch, commitment in training and dressing room disruptiveness. Carmichael and Thomas (1993), however, believe this to "be controlled to some extent by the 'footballer's grapevine'". Thus, adverse selection does not seem to be a big problem in football. Moral hazard, on the other hand, is the uncertainties associated with the player's performance, behaviour, commitment and effort after the transfer. Carmichael and Thomas (1993) state: "Any potential for moral hazard would seem to arise from reduced commitment or effort after a player transfers". However, we do not think this is a big problem. A player's behaviour is observed many hours every day on the training ground, giving the club's manager and coaches the possibility to remove unwanted behaviour in an early stage. Besides, contractual arrangements can help reduce some moral hazard problems. For example, a player can have incentives to execute a high level of performance through contractual bonuses. And if the player fails to deliver as expected, the option-like characteristics of the transfer – i.e. a player cannot have a negative impact on revenue – enables the club to remove the player from the squad and/or sell/lend him out. Alternatively, as mentioned under our presentation of the transfer market, a football club can loan a player with the option to buy him at the end of the

loan period. If the player fails to meet the expected performance during the loan period, the football club will not exercise the option to buy. To sum up, asymmetric information is not a problem with football players. In fact, it is almost non-existent. The players' qualities and behaviour are easily observable at a relatively low cost before and after the transfer, eliminating both adverse selection problems and moral hazard problems. This is an extraordinary feature of the football world, and a dream scenario for anyone having to make investments in human capital. As Kahn (2000) puts it:

Professional sports offer a unique opportunity for labor market research. There is no research setting other than sports where we know the name, face, and life history of every production worker and supervisor in the industry. Total compensation packages and performance statistics for each individual are widely available, and we have a complete data set of worker-employer matches over the career of each production worker and supervisor in the industry.

Although we did not state it explicitly, our valuation factors framework heavily depends on there being no asymmetric information. So, for the owner(s) and decision makers of the club, no asymmetric information means that they are able to identify attractive players – i.e. players who increase performance or supporter satisfaction – with the valuation factors framework. But that is not all. No asymmetric information will also allow the decision makers of the club to say something about how a player is likely to develop in the future. Consequently, we can now go one step further and address the uncertainties we mentioned in the introduction of this section. That is, how the player will affect performance and supporter satisfaction in the future and how we can quantify that in money terms. In our first approach we will implement the factor 'increased performance' in an existing model that treats the uncertainties with future performance stochastically. In our second approach we will try to implement the factor 'fan appeal' in this existing model.

4.2.2 First approach – implementing 'increased performance'

Our first approach will draw on the paper 'An option pricing framework for valuation of football players' by Tunaru et al (2005). They use "contingent claims methodology and standard techniques in stochastic calculus to develop a framework for determining the financial value of professional football players" (Tunaru et al., 2005). The factor 'increased performance' suits their framework, as they price a football player based on his performance. To some extent, this also suits the factor 'fan appeal', i.e. the part of fan appeal that consists

of ‘outstanding talent and exceptional performance’. In the following pages we will thoroughly explain their model. Then we will interpret it and develop and adapt it to our valuation factors. Finally, we will hopefully be able to include the fan appeal factor as well, concluding the first part of our research topics – What value can a football player add to a football club?

4.2.2.1 Explaining the model

The paper uses ‘Opta Index points’ as a proxy of how good a player is. The Opta Index points are a quantified method to establish the performance of a player. The Opta Index is a statistical database that tracks all goals, passes, mistakes, etc. a player does every match and is therefore a good proxy for performance. We will use the same notation as in Tunaru et al. Let T be the revenue for the club, N the number of Opta Index points for the individual player under evaluation, and S be the sum of Opta Index points for all players playing for the club. Then it follows that

$$X = \frac{T}{S} \quad (1)$$

is the financial value per Opta Index point for the club, and

$$Y = NX \quad (2)$$

is the Opta value of the player.

The writers assume the revenue (T) and the Opta value of the team (S) to follow correlated geometric Brownian motions. The idea is that S will affect T and vice versa. ‘ S ’ can also be viewed as the team’s performance. An increased S is a proxy of increased performance, and as we have discussed, this is expected to affect the revenue. The differentials for the revenue (T) and sum of a team’s Opta Index points (S) are:

$$dT = \alpha T dt + \sigma T dz$$

$$dS = \gamma S dt + \delta S dw$$

where the first terms are the drift rates, and the second terms are the uncertainty. The correlation between these two processes can be written as

$$E(dzdw) = \rho dt$$

where ρ is the correlation.

The number of Opta Index points for an individual player is also assumed to follow a geometric Brownian motion:

$$dN = aNdt + bNdH \quad (3)$$

Consider a football club as a portfolio of football players. Each player has some attributes that affect the on-field performance, represented by the Opta Index points, and with that the football club's ability to generate revenues. The football club knows what N is today, but the future development of N is uncertain. In a financial perspective N is a single stock, and assumed to follow a geometric Brownian motion. The stock's expected rate of return, or drift rate, is 'a' with volatility 'b'. See our comments for a discussion of the variables and their drift rates and variation rates. For all the players in the portfolio (i.e. the team), S is the sum of each player's N. In a financial perspective S is a stock index. Hull (2009) assume that a stock index can be treated as an asset paying a known yield, e.g. a stock paying dividends equal a known fraction of the stock price. Thus, a stock index can be modeled with a geometric Brownian motion (note that this is an approximation) and using this parallel, S is assumed to follow a geometric Brownian motion. Hence, from now both N and S are assumed to be geometric Brownian motions.

4.2.2.2 The money value of one Opta Index point

First, we need to calculate the financial value of one Opta Index point. X from Equation (1) is a measure of how much a single Opta Index point is worth in financial terms to the football club. Apply a multivariate Ito's Lemma to get an expression for the differential dX (see the appendix):

$$dX = ([\alpha + \delta^2 - \gamma - \rho\delta\sigma]X)dt + \sigma Xdz - \delta Xdw$$

$$dX = [AX]dt + X\sqrt{\sigma^2 + \delta^2 - 2\sigma\delta\rho} d\Omega$$

where

$$A = \alpha + \delta^2 - \gamma - \rho\delta\sigma \text{ and}$$

$$d\Omega = \frac{\sigma dz - \delta dw}{\sqrt{\sigma^2 + \delta^2 - 2\rho\delta\sigma}}$$

The next step is to find the differential dY, and finally find an equation for the financial value of a player. The writers have different assumptions as to whether a player is evaluated by his

own football club or an outside club. In the former case they assume the Ito processes N and X to be correlated, i.e. the player's performance affects the money value of a single Opta Index point for the football club, whereas for the latter case they assume the processes to be uncorrelated, i.e. the player's performance does not affect the money value of a single Opta Index point for the football club. We will comment upon this after the presentation of this paper.

4.2.2.3 The evaluation by an outside club

Applying a multivariate Ito's Lemma on the equation $Y = NX$ and assuming N and X to be uncorrelated, they get (see the appendix):

$$dY = (A + a)Ydt + BYd\Delta$$

where dY describes the development of the Opta Index value of the player, and

$$B = \sqrt{b^2 + \sigma^2 + \delta^2 - 2\sigma\delta\rho}$$

$$d\Delta = \frac{bdH + \sqrt{\sigma^2 + \delta^2 - 2\sigma\delta\rho} d\Omega}{\sqrt{b^2 + \sigma^2 + \delta^2 - 2\sigma\delta\rho}}$$

4.2.2.4 The evaluation by the player's club

The only difference from the above assumptions is the correlation between the processes N and X:

$$E(dHd\Omega) = \psi dt$$

Applying a multivariate Ito's Lemma, they get (see the appendix):

$$dY = DYdt + BYd\Delta$$

where

$$D = A + a + \psi b \sqrt{\sigma^2 + \delta^2 - 2\sigma\delta\rho}$$

The only difference between the equations for dY is the drift term (A+a or D).

4.2.2.5 The effect of injuries

Injuries will affect the money value of the player. The arrival of injuries is modeled with a Poisson process, as injuries are explicit events arriving at discrete times: "This type of stochastic process is appropriate for rare events and it has been used successfully in the

insurance industry” (Tunaru et al., 2005). The intensity parameter of the Poisson process is the parameter $\lambda > 0$. Each player will have his own parameter, and the estimate of the parameter will depend on “the position of the player in the team’s formation, age, previous records, medical examinations, and so on” (Tunaru et al., 2005). The money value of the player is now denoted V , and is a function of the Opta Index value of the player and time: $V=V(Y,t)$. In other words, $V(Y,t)$ is the financial value of a football player determined by a football club’s revenue (T), team performance (S) and the evaluated player’s performance (N). Remember that the Opta value is $Y=N\cdot T/S=N\cdot X$. Consider now that the Poisson process representing the injuries only affects the money value V of the player, and not the Opta Index points Y . Let $l(Y,t)$ denote the loss per interval of time dt due to injuries. The expected amount of loss per interval in time dt is $\lambda l(Y,t)dt$. Then the return on the value of the player per time interval dt , using a risk free interest rate r , is equal to the expected change in the money value of the player minus the expected losses due to injuries:

$$rVdt = E_{\Delta}(dV) - \lambda l(Y, t)dt$$

The first term on the right hand side is calculated by applying Ito’s Lemma and taking the expectation with respect to the Wiener process Δ . If the evaluation is done by an outside club they get the following equations:

$$E_{\Delta}(dV) = \left[\frac{\partial V}{\partial t} + (A + a)Y \frac{\partial V}{\partial Y} + \frac{1}{2} B^2 Y^2 \frac{\partial^2 V}{\partial Y^2} \right] dt$$

$$rV(Y, t) = \frac{\partial V}{\partial t} + (A + a)Y \frac{\partial V}{\partial Y} + \frac{1}{2} B^2 Y^2 \frac{\partial^2 V}{\partial Y^2} - \lambda l(Y, t) \quad (4)$$

And if the evaluation is done by the player’s club, the only difference is the coefficient of $\partial V/\partial Y$:

$$rV(Y, t) = \frac{\partial V}{\partial t} + DY \frac{\partial V}{\partial Y} + \frac{1}{2} B^2 Y^2 \frac{\partial^2 V}{\partial Y^2} - \lambda l(Y, t) \quad (5)$$

Equation (4) and (5) can be solved either analytically or by resorting to numerical methods. Note that we assume the football clubs to be risk neutral. Hence the rate of return (r) is risk free.

4.2.2.6 Modelling the value of the player as a jump-diffusion process

Suppose instead that injuries affect the number of Opta Index points, N , for the player under evaluation. Tunaru et al. use a jump-diffusion process to model the value of the player in this case. They argue that N is a time series that experiences downward jumps when the player under evaluation has injuries. The change is made in Equation (3):

$$dN = aNdt + bNdH + K(N)dJ(t)$$

where $K(N)$ is the amplitude of the jump in N , and $J(t)$ is a counting process representing the number of jumps occurring in the interval of time $[0, t]$. This process is usually a Poisson process with intensity parameter λ , which means that the probability of having a jump in the next interval of time dt is λdt (See Hull, 2009; Baz and Chacko, 2004).

Suppose that the amplitude of the jumps is given by

$$K(N) = N(t)(k - 1)$$

Therefore

$$N_{after} - N_{before} = N_{before} + K(N) - N_{before} = N_{before}(k - 1)$$

$$N_{after} = kN_{before}$$

k is interpreted as the average jump size measured as a percentage of N . It cannot be negative and we get downward jumps only when $k < 1$. Thus, we expect $0 < k < 1$.

Consider now the case where a football club wants to evaluate a player playing for an outside club. We need to establish the differential for $Y = NX$, which is

$$dY = (A + a)Ydt + BYd\Delta + [\Delta_K(Y)]dJ(t)$$

where

$$B = \sqrt{b^2 + \sigma^2 + \delta^2 - 2\sigma\delta\rho}$$

$$d\Delta = \frac{bdH + \sqrt{\sigma^2 + \delta^2 - 2\sigma\delta\rho} d\Omega}{\sqrt{b^2 + \sigma^2 + \delta^2 - 2\sigma\delta\rho}}$$

$$\Delta_K(Y) = Y(N(t) + K(N(t)), X(t), t) - Y(N(t), X(t), t)$$

The authors see the value of the footballer as a contingent claim on his or her performance value Y generated from the Opta Index. Following standard contingent claim analysis (see Dixit and Pindyck, 1994), they get

$$E_{\Delta}(dV) = \left[\frac{\partial V}{\partial t} + (A + a)Y \frac{\partial V}{\partial Y} + \frac{1}{2} B^2 Y^2 \frac{\partial^2 V}{\partial Y^2} + \lambda G(V) \right] dt + G(V) dM(t)$$

where

$$dM(t) = dJ(t) - \lambda dt$$

$$E[dM(t)] = 0$$

$$G(V) = V(Y(t) + \Delta_K(Y(t)), t) - V(Y(t), t)$$

Applying again the expectation with respect to the martingale $M(t)$ they get:

$$E_M(E_{\Delta}[dV]) = \left[\frac{\partial V}{\partial t} + (A + a)Y \frac{\partial V}{\partial Y} + \frac{1}{2} B^2 Y^2 \frac{\partial^2 V}{\partial Y^2} + \lambda G(V) \right] dt$$

$$rVdt = E_M(E_{\Delta}[dV])$$

$$rV(Y, t) = \left[\frac{\partial V}{\partial t} + (A + a)Y \frac{\partial V}{\partial Y} + \frac{1}{2} B^2 Y^2 \frac{\partial^2 V}{\partial Y^2} + \lambda G(V) \right] \quad (6)$$

The only difference between an inside and an outside player is the coefficient of $\partial V/\partial Y$, as in the previous case:

$$rV(Y, t) = \left[\frac{\partial V}{\partial t} + DY \frac{\partial V}{\partial Y} + \frac{1}{2} B^2 Y^2 \frac{\partial^2 V}{\partial Y^2} + \lambda G(V) \right] \quad (7)$$

The interpretation of $\lambda G(V)$ is the expected loss in value caused by injury. Again, these equations can either be solved analytically or by resorting to numerical methods.

4.2.3 Interpreting the model

In the following we will make general comments about Tunaru et al.'s model, and we will explain the variables and their drift and variance rates. We will also interpret the different valuation equations, their terms and link them up to our two valuation factors.

4.2.3.1 General comments

Tunaru et al. assume the revenue T and the Opta Index points of the team S to influence each other. An increase in S can be viewed as increased performance, and as we discussed under the factor ‘increased performance’, this will increase revenues. Thus, we would expect to see positive values of the correlation, ρ . Looking at Arsenal FC, a football club in the English Premier League, they found this correlation to be about 80%. This is consistent with our view of the football club as a maximiser of performance and fan satisfaction, and that this is the same as maximizing revenue.

If you consider S to be a measure of team performance, it is of interest to find the effect a new player will have on S . The advantage of using the sum of Opta Index points is that only players actually playing will be included in this sum, if a player does not play he will not have Opta Index points. Bringing a new player in can cause other players to play less, it is therefore important that the new player’s Opta Index points is higher than the Opta Index points lost by not playing the other players. In other words, the new players should be better than the players excluded. The effect a new player has on S is more interesting than the individual Opta Index points the new player obtains (N). As we quoted earlier, a player can have “the capability to raise the play of the rest of the team as a unit, a species of externality” (Carmichael, Forrest and Simmons, 1999). Thus, having an opinion of how a new player can affect S is important. Finding dT/dS prior to the transfer and applying the change in S if a transfer goes through, will give a football club the financial value of increased/decreased performance. Actually, we have already made a framework to find dT/dS – the valuation factors’ ‘increased performance’. Hence, applying our valuation factors framework together with the model of Tunaru et al. should give us a good estimate of the increased performance-part of a player’s value. Note that the use of Opta Index points is not necessary. The important thing is to quantify dT/dS , team and player performance, and how it might change. However, we do think Opta Index points are a good proxy for team performance and should be considered when assessing a player’s performance. As mentioned earlier, team performance includes ranking, wins and entertainment. The use of Opta Index points does not violate this view, as a higher S can lead to a higher ranking, more wins and/or entertainment.

We support the paper’s use of a Poisson process to describe the arrival rate of injuries. The authors include injuries in two methods. In the first case injuries only affect the money value V . In the second case injuries affect the number of Opta Index points for the player under evaluation and Opta Value Y which subsequently affects V . We prefer the latter method

(Equation (6) and (7)), as we think this gives a better understanding of how injuries affect a player's performance: In the first matches after an injury, a player might need some time to reach his normal performance level. This will also affect team performance (S) which is the sum of each player's performance (N).

If an outside club is evaluating a player, Tunaru et al. assume the player's individual Opta Index points N to be uncorrelated with the financial value per Opta Index point $X=T/S$ for this football club. This implies that N also is uncorrelated with S and T. This is only true before the transfer takes place. After the transfer, N will affect both S and T and consequently X. If a football club is evaluating a player currently playing in another team, this club should ask itself: What will happen with our team performance and revenues if we buy this player? If a football club is evaluating one of its own players it should ask itself: How does this player affect team performance and revenues? We claim that there is no difference in these two questions. Hence, there is no difference in evaluating an outside player (another club's player) and an inside player (the club's own player). So, for an outside club's evaluation to be meaningful, the evaluated player must be treated as he is playing for the club.

4.2.3.2 Do the equations make sense?

So far we have not interpreted the equations or commented upon the magnitude and sign of the variables, its drift and variance rates and derivatives in the model. The magnitude of these will most likely be determined by the individual player under evaluation and the football club itself. We will explain every part in the valuation Equation (6) and (7), both because we want to see how Tunaru et al.' model fits with our valuation factors, and because we plan to use the model in an example later on.

Individual performance

This equation captures the expected development and uncertainties concerning individual performance:

$$dN = aNdt + bNdH$$

We expect the signs to be universal for different kinds of players. For example, a young player should be expected to have a positive change in his performance, N. This translates to a positive drift rate, $a > 0$. For an older player past his prime this drift rate can be expected to be negative, $a < 0$. Thus, the drift rate (a) becomes a function of time. The magnitude of a will also depend on the player's age, but we postulate that the magnitude of a will also depend on

the current level of performance, N . Hence a will be a function of both time and performance: $a(N,t)$. Consider a young player with a relatively low level of performance, N . This player can be interpreted as an unpromising player, and is less likely to improve, hence this player's a should be low. The player's performance over time, $N(t)$, can be a parabola peaking at the player's prime age, implying that the shape of $a(N,t)$ is a downward sloping line. The width and height of the parabola is determined by, for example, how promising the player is and the player's age. The width is a measure of how long the player's professional career is going to be. We have illustrated this with a figure:

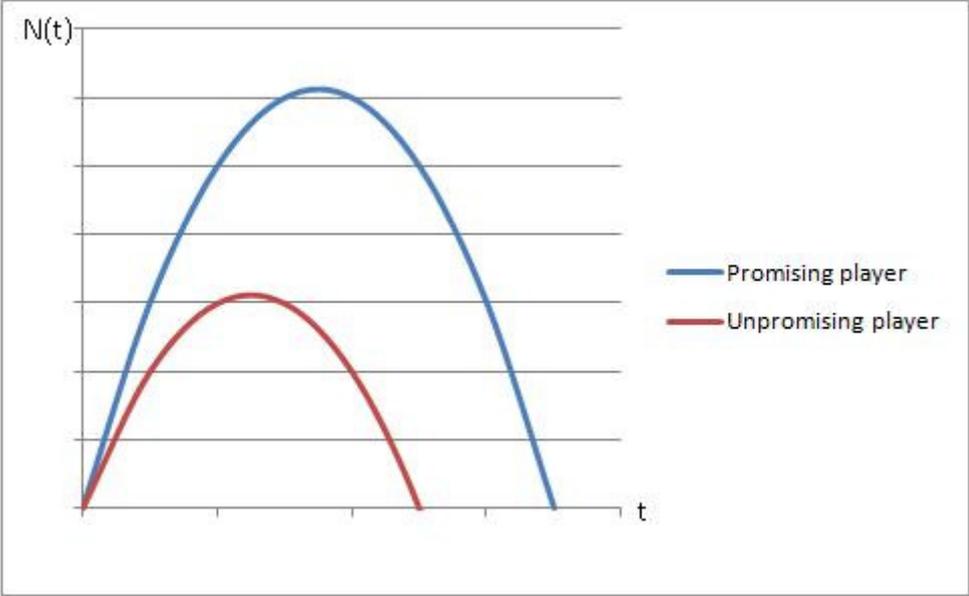


Figure 4 Different kinds of players

't' can be considered the age of the player. Combinations of N and t (age) describe where a player is in his career and the future outlook. How a football club evaluate this combination is important in what valuation factors (increased performance and fan appeal) to use. We have summarized this in a table:

Individual performance (N) today					
“High”		“Average”		“Low”	
Drift rate in performance (a), i.e. expected development of performance					
High	Low	High	Low	High	Low
Depending on how high N is, this can already be a star player. In any case, this player is likely to be a star, and might fulfil both valuation factors, at least increased performance. Depending on the player’s age, this can be an outstanding talent.	Depending on how high N is, this can be a star player. This player can fulfil both valuation factors, at least increased performance.	Promising player, most likely to be young. Have the potential to fulfil both valuation factors over time. Depending on how N is, this can be an outstanding talent, thus fulfilling ‘fan appeal’	Average team player at his peak level or past his prime. May still contribute to performance. ‘Fan appeal’ can be both high and low. This is any player not playing in a top club.	Can be a promising player, most likely to be young. Have the potential to fulfil both valuation factors over time. Depending on how N is, this can be an outstanding talent, thus fulfilling ‘fan appeal’.	Unpromising player. Not likely to fulfil any of the two valuation factors. E.g. The authors of this paper.

Table 4 Combinations of performance and expected development

When a football club is evaluating a player’s performances, it can use this table to see what valuation factors the player potentially can fulfil now and in the future.

We will now describe the variance rate, b^2 , in individual performance. The variance rate is positive, and multiplied with the Wiener process. (Remember that the uncertain outcome is due to the Wiener process, there is no uncertainty in the drift rates. E.g. the uncertain outcome in dN is due to the Wiener process dH .) The variance rate, b^2 , in individual performance, N , is a measure of variation in a player’s performance. When b increases, a player will have bigger fluctuations in his or her performance. Consider a player with a marginal style of play, i.e. the player often chooses a difficult alternative in preference to a simpler alternative. This player will most likely have relatively big fluctuations in his performance, as he might rarely succeed but when he succeeds he delivers relatively high performance. So, this kind of player should be assigned with a relatively high variance rate, b^2 . A high variance rate should also be applied to young players, still learning their trade.

Revenues

This equation captures the expected development and uncertainties concerning the football club’s revenues:

$$dT = \alpha T dt + \sigma T dz$$

We will now describe the drift rate (α) for the revenues (T). That is, how we expect revenues to develop in the future. Remember the three revenue sources and how the factor increased performance affected them, and the criteria a football club should fulfil to be able to increase these revenue sources. Based on our analysis we expect the drift rate (α) to be a function of a team's performance (S) and some club specific factors describing the football club's ability to increase revenue, i.e. the criteria just mentioned. In fact, we would like α to be a function of the change in performance (the reason for this is that a stable performance, i.e. $dS=0$, does not necessarily have an effect on revenues in our analysis, while increased/decreased performance, $dS \neq 0$, will most likely have a positive/negative effect on the expected change in revenues), and the club specific factors: $\alpha(dS, CSF_T)$, where CSF_T is the club specific factors. So, bringing in a player who fulfils the increased performance factor is a direct way to increase the growth in revenues. Unless there is an exogenous shock in revenues, not explained by the current performance, we expect the change in performance to affect revenues, and not vice versa. For example, an exogenous shock can be a financial crisis hitting, amongst others, the football club's consumers. This can lower the football club's revenues. In this case the football club might have to lower its costs by selling off players.

The variance rate, σ^2 , in revenues, T , can depend on the economic climate and stability in team performance. Economic cycles will create fluctuations in the demand for the football club's product. If a football club's performance is unstable, its revenue can fluctuate more than for football clubs with stable performances. Unstable performance can frustrate the football club's consumers and their propensity to consume.

Team performance

This equation captures the expected development and uncertainties concerning the football club's performance:

$$dS = \gamma S dt + \delta S dw$$

We have touched upon one factor that can change a football club's performance (selling off players to lower the costs). Other factors affecting a football club's performance, and its ability to change this performance, can be the current manager's skills and his style of play, and the training ground facilities and the coaches' skills. These are more or less club specific factors affecting the performance. However, the most important factor affecting a team's

ability to change its performance is the players. For example, the ability to attract new talent and to be able to invest in these talented players can increase the football club's performance, i.e. investing in players that fulfil the factor increased performance (or exceptional performance in fan appeal). Thus the drift rate in team performance (γ) is a function of club specific factors (CSFs) and ability to attract and invest (AI) in talent which can increase performance: $\gamma(\text{AI}, \text{CSFs})$. Remember also that a single player can raise the performance of the other players, a species of externality. Buying such a player will increase γ even more.

The variance rate (δ^2) in team performance (S) is analogous to the variance rate, b^2 , in individual performance, N: When δ increases, the team will have bigger fluctuations in its performance. The obvious case of a high δ is when a team consists of too many players with varying performance. We have already commented upon the correlation between dS and dT (ρ). As mentioned we expect this to be positive. When it comes to the correlation between N and X, ψ , Tunaru et al. assume this to be positive in their example (we will go through the example later). We have now described factors affecting the drift rates (a , α and γ) and variance rates (b , σ and δ) for individual performance, revenues and team performance. We have marked the drift and variance rates in red (the Opta value (Y) is already explained):

$$rV(Y, t) = \left[\frac{\partial V}{\partial t} + (A + \alpha)Y \frac{\partial V}{\partial Y} + \frac{1}{2} B^2 Y^2 \frac{\partial^2 V}{\partial Y^2} + \lambda G(V) \right] \quad (6)$$

$$rV(Y, t) = \left[\frac{\partial V}{\partial t} + DY \frac{\partial V}{\partial Y} + \frac{1}{2} B^2 Y^2 \frac{\partial^2 V}{\partial Y^2} + \lambda G(V) \right] \quad (7)$$

where

$$A = \alpha + \delta^2 - \gamma - \rho\delta\sigma$$

$$D = A + \alpha + \psi b \sqrt{\sigma^2 + \delta^2 - 2\sigma\delta\rho}$$

$$B = \sqrt{b^2 + \sigma^2 + \delta^2 - 2\sigma\delta\rho}$$

Finally, we will describe the presence of injuries and the partial derivatives $\partial V/\partial t$, i.e. the change in value (V) over time (t); $\partial V/\partial Y$, i.e. how much the player's financial value (V) change when the Opta value (Y) change; and $\partial^2 V/\partial Y^2$, describing if the effect of increased Opta value (Y) on value (V) is accelerating or diminishing.

The value of the player

As the valuation model does not take any costs into account, we interpret the financial value (V) of a player to be the present value of his contribution to revenues. In other words, the financial value can be considered a player's gross value to the club. To find a player's net value we must subtract the present value of the costs related to the player (e.g. salary) from the financial value (V). We will come back to this in our example.

Analogous to $N(t)$, we expect the shape of $V(t)$ to be a parabola peaking at the player's prime age. When we use $V(t)$, and not $V(Y,t)$, we look at the isolated effect time (t) has on the financial value (V), and we do not take the Opta value (Y) into consideration. Thus the expected sign and magnitude of $\partial V/\partial t$ is positive and relatively large in the beginning of a player's career, zero at the peak, and negative and relatively large, in absolute terms, when a player is approaching the end of the career. The width of the parabola is decided by the length of the evaluated player's professional career, and the height (the value of the player) of the parabola is decided by how the player fulfils the valuation factors. Here illustrated with a figure:

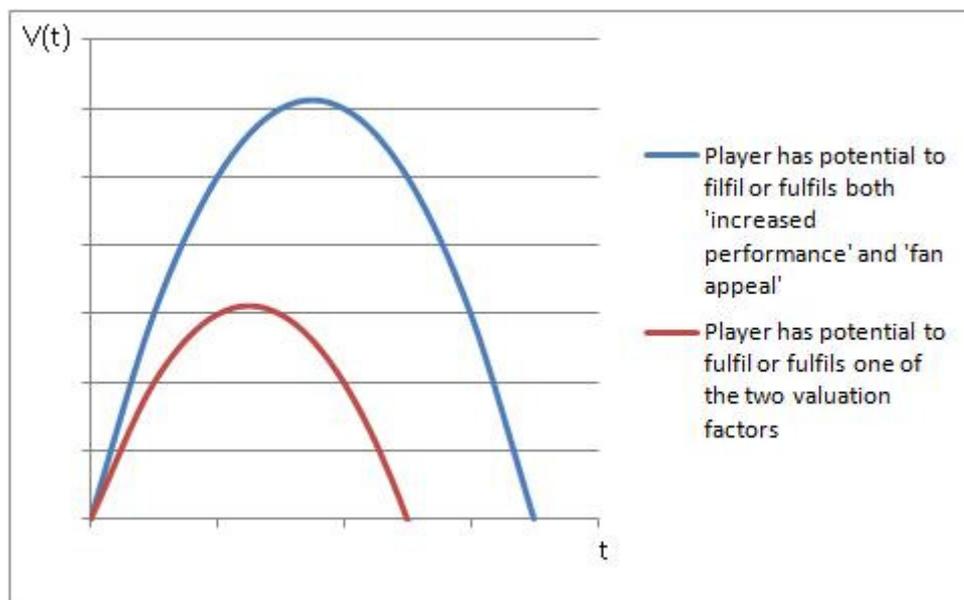


Figure 5 Value and length of career for different kinds of players

Again, t can be considered the player's age. One can interpret $V(t)$ as the expected contributions the evaluated player will have on revenues. The contributions are current and future cash flows while the player is playing at the football club, which – in this figure – is assumed to be for the rest of his career. So, the correct interpretation of $V(t)$ is the value of the

player if the player stays with the club for the rest of his career. Consequently, an offer from another club will have to compensate for all the cash flows the player would have generated in his current club for the rest of his career.

If you change the word ‘career’ with the word ‘contract’ in the above paragraph it becomes more realistic: we cannot assume that a player will stay at a club for the rest of his career. As we have discussed before, a player will be under contract for a certain amount of time (maximum 5 year for professionals and 3 year for youths). At the end of the contract the player can sign for a new club without any compensations being paid to the previous club, unless he renews his current contract (cf. the Bosman ruling). One obvious advantage of using contract length instead of career length as investment horizon is less modelling error. The contract length is known, while the length of a player’s career is unknown. We will illustrate the value, $V(t)$, of a player who has just signed a five year contract. The player does not renew his contract, and will be “worthless” after five years:

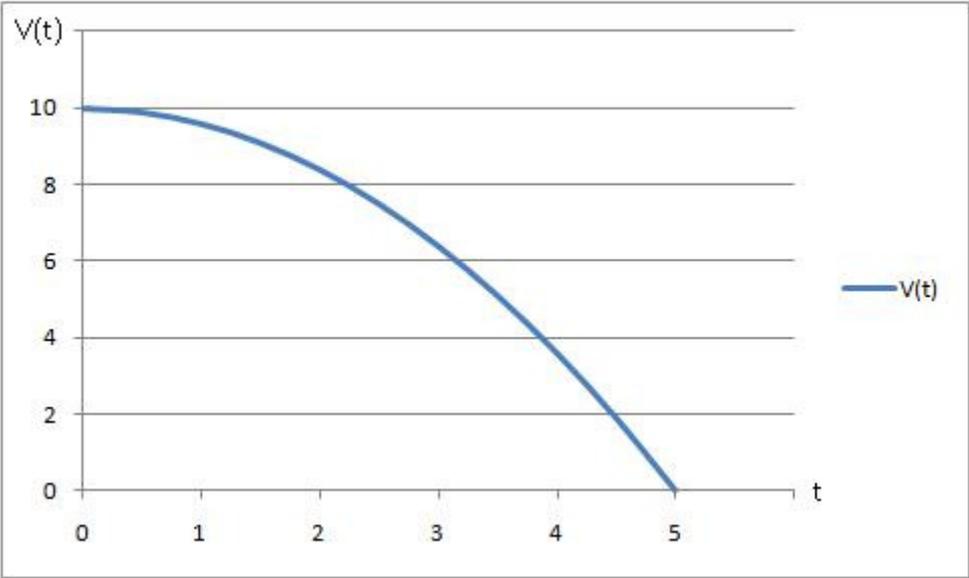


Figure 6 Development in value as contract expires

We have chosen a concave graph. The idea is that the closer the player gets to the end of the contract, the more will the value fall. So, the value will fall more during his last year (from $t=4$ to 5) in contract, than during his first year (from $t=0$ to 1). Note that $\partial V/\partial t$ is negative in this example. In the next section where we answer the last research topic, we will come back to this.

Anyway, no matter how long the investment horizon is, the cash flows are risky and this risk is reflected in the discounting of the cash flows: The higher the risk, the higher the discount

rate. E.g.: A young, unproven player will have a relatively big risk (high discount rate) linked to his expected cash flows over his contract period. Because of a relatively high discount rate, this player might not have a high financial value. Consider now the same player a few years later, ignoring the length of the contract. He has now proven his ability, and the risk linked to his expected cash flows are lower (lower discount rate). Even though the expected cash flows can be the same as when he was younger, the financial value of this player will be higher, because of the lower discount rate. The cash flow risk can be one reason we rarely see young, unproven players in big money transfers (ignoring the fact that the legal framework in the transfer market and labour market can prevent young players to be involved in (big) money transfers).

Next up is the Opta value (Y) derivative of a player's financial value (V): $\partial V/\partial Y$. We expect value (V) and Opta value (Y) to be closely related such that $V(Y)$ is an upward sloping curve, and $\partial V/\partial Y$ has a positive sign. We now explore the isolated effect Opta value (Y) has on the financial value of the football player (V), and we do not consider time (t). The change in the slope of $V(Y)$ (i.e. $\partial^2 V/\partial Y^2$) can be expected to be slightly positive. This is because a relatively high Opta value (Y) can indicate that the player is a very skilled player, and even a star player. We have discussed the effect star players have on revenues, especially in our 'fan appeal' factor: Players with fan appeal can increase revenues in other ways than just through their performance. So, as Opta value (Y) increases, financial value (V) is expected to increase more because of talented players' inherent fan appeal. Hence, the sign of $\partial^2 V/\partial Y^2$ can be positive. We have also illustrated this with a figure:

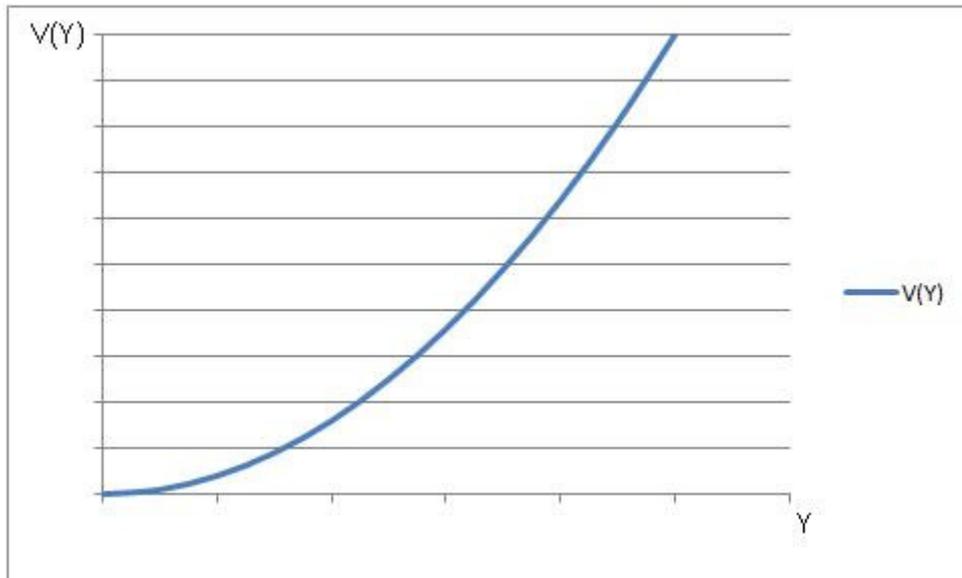


Figure 7 Development in financial value as Opta value changes

You can think of the figure this way: A higher Opta value (Y) can indicate that the player fulfils one or both valuation factors to a higher degree, accelerating the player's ability to increase revenues. Remember that when we refer to fan appeal in Tunaru et al.'s model, we only consider outstanding talent/exceptional performance (N) and not remarkable popularity as this is not included in the model. We shall discuss and include all aspects of 'fan appeal' later on. Note that in our discussion, $\partial^2 V / \partial Y^2$ can be a constant, i.e. $V(Y) = aY^2 + bY + c$, where $a (>0)$, b and c are constants.

Injuries

Injuries will have an effect on how a player fulfils the valuation factors. E.g.: If a player is injured, he cannot increase the team's performance, and if a player with fan appeal picks up an injury, his popularity might diminish during his absence. Both these examples will have an effect on revenues. How large the effect of injury is, depends on to what degree a player fulfils the valuation factors. In other words, the magnitude of the loss depends on the value of the player: a player with a high valuation fulfils the valuation factors to a high degree. As we mentioned earlier, we support the author's use of a jump-diffusion process in describing the effect of injuries. The maximum loss is $G(V)$, and occurs if a player is injured all the time ($\lambda=1$). If this is to happen to a player only fulfilling the increased performance factor, it would make this player worthless. Players with fan appeal might not be worthless. The reason is that a player with fan appeal might still generate revenue through his popularity, by e.g. merchandise sales, even though the player is always injured. The intensity parameter (λ)

describes at what frequency rate injuries arrive. If a player normally is injured one month each year, the parameter is 1/12. As we mentioned earlier, a football club should have a reasonable assumption of what the injury intensity parameter (λ) is through its well-informed network.

We have now covered all the variables, coefficients and derivatives in the valuation equations. Again, marked in red:

$$rV(Y, t) = \left[\frac{\partial V}{\partial t} + (A + a)Y \frac{\partial V}{\partial Y} + \frac{1}{2} B^2 Y^2 \frac{\partial^2 V}{\partial Y^2} + \lambda G(V) \right] \quad (6)$$

$$rV(Y, t) = \left[\frac{\partial V}{\partial t} + DY \frac{\partial V}{\partial Y} + \frac{1}{2} B^2 Y^2 \frac{\partial^2 V}{\partial Y^2} + \lambda G(V) \right] \quad (7)$$

We will conclude this part by summarizing how our valuation factors affect each of the variables, coefficient and derivatives. But first we will try to include the fan appeal factor in its full extent.

4.2.4 Second approach – Implementing ‘fan appeal’ in the model

In their model, Tunaru et al. only describe a player’s performance. This includes the whole ‘increased performance’ factor, but only some of the ‘fan appeal’ factor. Opta Index points, or other proxies for player performance, can cover some of the ‘fan appeal’ factor if the player evaluated has outstanding talent and exceptional performance. But, as we already have stated several times, a player can also have remarkable popularity without this being reflected in the player’s performance score. And as discussed under valuation factors, we would like to include the factor ‘fan appeal’ in addition to ‘increased performance’ because it is consistent with football clubs’ behaviour in the transfer market as revenue maximisers. If we had included only the increased performance factor, we would implicitly have assumed that football clubs act as performance or win maximisers instead, and our models would be inconsistent with football clubs’ actual behaviour. It is difficult, however, to measure fan appeal, especially the part of fan appeal that consists of remarkable popularity. Note that we will not add any new parameters to the valuation model. We will only use the current parameters, and describe how ‘fan appeal’ can be included with these parameters.

We think it is fair to assume that players with fan appeal can be split into two categories: They either have remarkable popularity, or they have remarkable popularity and outstanding talent/exceptional performance. The reason is that players with such a high level of performance that they fulfil the fan appeal factor will also have remarkable popularity. We

have discussed how players with fan appeal will affect a football club's revenues: These players can increase attendance (matchday revenue), televised matches (broadcast revenue), merchandise sales and attract new sponsors (commercial revenue). This can be translated into a higher growth in revenues, increasing the revenue's (T) drift rate (α) The reason players with fan appeal can have such an impact on revenues, is because the number of the football club's consumers (fans, broadcasters and corporations) will most likely increase in wake of the transfer. (In addition, the existing consumers might want to consume more in wake of the transfer.) Consequently, the football club might get a more "diversified" consumer base, which in turn can lower the risk in revenues. This can be translated into a lower variance rate (σ^2) in revenues (T). Players fulfilling both valuation factors, i.e. players with remarkable popularity and exceptional performance, will in addition to the direct revenue effects on the revenue's drift (α) and variance rate (σ^2) also have an effect on a team's performance (S). An outstanding player (high N) will most likely increase the team's performance, increasing the drift rate (γ) of the team's performance (S). An outstanding player might also lower the variation in the team's performance, lowering the variance rate (δ^2) of team performance (S). The latter will depend on how consistently the player has exceptional performances (the variance rate in his individual performances), or alternatively if the player can raise the play of the rest of the team – making the whole team more consistent. This externality can also be translated into an even higher drift rate in team performance (γ).

When it comes to the partial derivatives, $\partial V/\partial t$, $\partial V/\partial Y$ and $\partial^2 V/\partial Y^2$, we use the same discussion as before. The only difference might be the shape of $V(t)$. The shape of $V(t)$ for players fulfilling both factors will be wide and high, because their talent allow them to have a relatively long career, and their talent and popularity will lead to a high valuation. Players only fulfilling the remarkable popularity aspect of 'fan appeal' might have a shorter career, as they are not necessarily especially talented (low N). But, they will still have a relatively high valuation. The shape of $V(t)$ then might be slim but high (see Figure 5). Let us instead, as before, introduce contracts and contract lengths. A player that fulfils both factors (star player) will start with a high value ($V(0)$), ending at zero value (contract expires) unless the contract is renewed, while a player that fulfils only one of the valuation factors (here we will call him "average player"), will start at a lower point, and also end at zero value. Here illustrated with a figure:

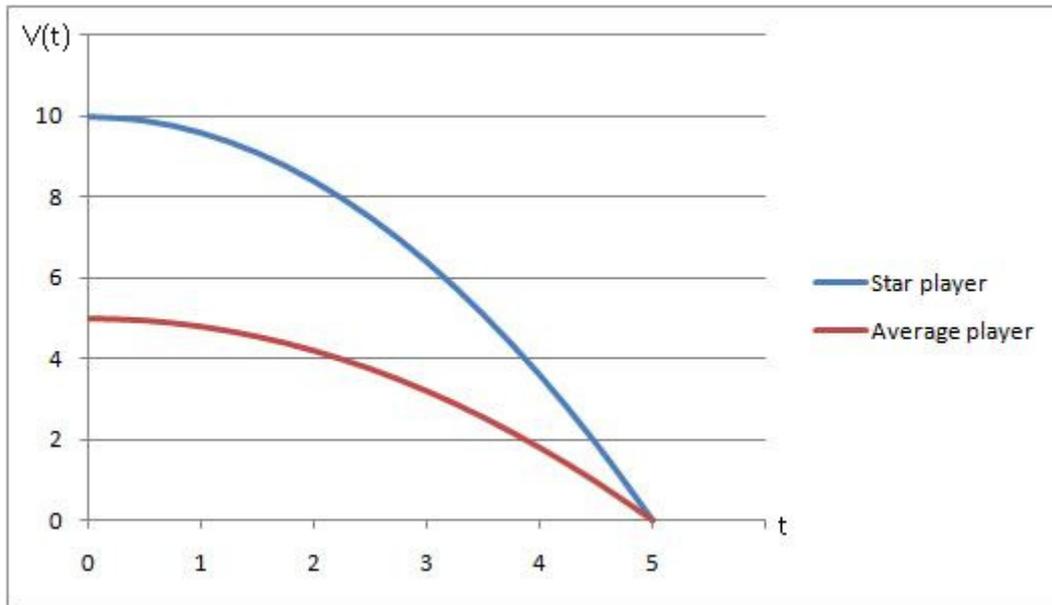


Figure 8 Development in value for different kinds of players, as contract expires

Note that the star player has a higher (in absolute terms) $\partial V/\partial t$ than the average player. We will come back to this in the next section, when we answer our second research topic.

For players only fulfilling remarkable popularity the Opta value ($Y=NX$) will be far from their actual financial value (V), because of the relatively low N . This can also be the case for players with outstanding talent. We touched upon this earlier in our table over N and a (Table 4). An outstanding talent might have lower performance than older players in the same position, but the outstanding talented player is expected to give exceptional performance over time, in contrast to older players. Thus, players with outstanding talent are expected to be relatively young and have a rapid development (high drift rate, a) in their performance. Note that players with outstanding talent might not be remarkable popular today, but they are expected to be over time.

We will now expand Table 3 from valuation factors and increased revenues, to sum up our discussion.

Player has fan appeal (One or more of outstanding talent, exceptional performances and remarkable popularity)							
Yes				No			
Player will increase (higher γ) team performance (S), through own performance and/or externalities							
Yes		No		Yes		No	
Expected development (a) of individual performance (N)							
High	Low	High	Low	High	Low	High	Low
This player is an outstanding talent, has exceptional performances and is remarkable popular. Will increase all three revenue sources.	This player has exceptional performances and remarkable popularity, but is no longer an outstanding talent. Will increase all three revenue sources.	This player has outstanding talent and maybe remarkable popularity. Has the potential to achieve exceptional performances (and remarkable popularity). Potential to increase all three revenue sources.	Player has remarkable popularity. This player is not meant to increase performance. Hence this player will get little playing time. Potential to increase all three revenue sources.	Talented player with good performances. Depending on age, potential to achieve fan appeal. Potential to increase all three revenue sources.	Player has good performances. Unlikely to achieve fan appeal. Depending on how much the team's performance increases: potential to increase all three revenue sources.	Relatively talented player. Depending on age, potential to achieve both 'increased performance' and fan appeal. Expected to get little playing time. Potential to increase all three revenue sources.	No potential to achieve any of the two valuation factors. Do not buy.

Table 5 Different kinds of players – expanded

This table is meant to give the club a quick overview of what kind of player it is evaluating. When the club has identified what kind of player they are evaluating, it can use the rest of this section to get a closer understanding of how the player will affect the club.

4.2.5 Conclusion

We have now implemented our two valuation factors ('increased performance' and 'fan appeal') in a model. We have also described how different categories of players can fulfil or have the potential to fulfil the valuation factors. Further, we explain what revenue sources they affect, and how this is expressed in the valuation model. Our first research topic (what value can a football player add to the owners of the football club?) is answered, and we have

introduced our second, and final, research topic (how much will they have to pay for the player?) with the valuation model. The next step is to use our model on a real life example.

4.3 Applying the valuation model

We will now draw on an example made by Tunaru et al. (2005) and Tunaru and Viney (2010). In this example we want to use the model to find the financial value of a football player (V), i.e. find a football player's current financial value for the inside club, and for an outside club. In the articles they analyzed the value of Thierry Henry, arguably Arsenal FC's biggest star, over the 2003-04 season in the English Premier League. When it comes to the valuation factors, it is of the authors' opinion that he fulfilled both. The player had exceptional performances throughout the season, consistently achieving higher Opta Index points than the average team score. So, the most notable feature of Henry should be his individual Opta Index points (N). In fact, Henry and his team's performances throughout the season (2003-04) were so high that they won the Premier League unbeaten. Note that from here on out we will use 'performance' instead of 'Opta', if it suits. The reason is that it is not necessary to use Opta Index points to measure performance; there are also other ways performance can be measured.

4.3.1 The valuation factors

In this section we will discuss how Henry might have fulfilled the valuation factors, and how this could have contributed to the club's revenue. We will base our discussion on Table 2 and 3.

4.3.1.1 Increased performance

Henry had a high level of performance throughout the season, and the correlation between his performance and the team's performance was as high as 60%. It is therefore reasonable to assume Henry increased the performance of the whole team, both through his own performances and through externalities. So, through Henry's exceptional performances the matchday revenue could have been affected by higher attendances, more matches (as the team qualified to the UEFA Champions League by winning the Premier League), and higher ticket prices the following season(s). The broadcast revenue could have been affected through more televised matches, both in the Premier League and in the UEFA Champions League. Finally, the commercial revenue could have increased due the consumers' attraction of success, mainly through increased merchandise sales and sponsorship deals.

4.3.1.2 Fan appeal

Through Henry's exceptional performances we expect him to be very popular among the consumers. In addition Henry had an ambassadorial status off the field, which also underlines his popularity. Through the level of performance and popularity, it is reasonable to believe Henry attracted higher attendances, increasing the matchday revenue. The same goes for the broadcast revenue: his popularity could have increased the number of televised games, increasing the broadcast revenue. As for commercial revenue, we assume Henry's popularity to have increased the demand for merchandise associated with him. This popularity could also have led to higher interest from corporations, increasing the revenue from sponsoring.

We will conclude by using Table 3: Henry could have been placed in the column on the left hand side, as he fulfilled both valuation factors.

4.3.2 The variables, coefficients and derivatives

In the following, we will describe Henry using the valuation model.

4.3.2.1 Performance points and performance values

Henry's average Opta Index points per match was around 1450, while the average score per match for the whole team (average S per match) were around 11000. To find the average per player per match, we divide 11000 with 11 (the number of players on the field), which is 1000. As we argued, having exceptional performances will make a player remarkably popular, and Henry was (and still is) a popular player among the Arsenal fans. Based in the discussion above, we expect Henry to have had a significant contribution to Arsenal FC's revenues during the 2003-04 season. We can use the performance value (Y) of Henry as a measure of how much he contributed to the revenues. Based on the club's turnover and total Opta Index points during the season (S), they found the value of a single performance point ($X=T/S$) to be £417. If we multiply the value per performance point (X) with Henry's total performance points ($Y=NX$), we get a measure of how much he contributed to the revenue that season. Based on these numbers, Henry's contribution was above £20m. We have summarized the numbers (X and Y in £) used so far in Table 6:

X (Arsenal FC)	417		
S (Arsenal FC)	415 000	Average S	10 921
N (Henry)	48 600	Average N	1 473
Y (Henry)	20 266 200		

Table 6 S, N, X, Y

4.3.2.2 The correlations, drift rates and volatilities

Tunaru et al. (2005) estimated the correlation (ρ) between the turnover of the club, week by week, and the team's performance to be 80%. In other words, some of the revenue cannot be explained by the team's (or Henry's) performance. If it had been possible, we should have divided the revenue in two parts. One part only explained by performance, and another part explained by other factors such as fan appeal. Then we could have divided the part of the revenue (T), explained only by performance, with total performance points (S), to find the exact value of one performance point ($X=T/S$). But since we cannot do this, a player's contribution (Y) might be (heavily) overestimated. One way to correct this overestimation can be to lower $\partial V/\partial Y$, but have a positive $\partial^2 V/\partial Y^2$ to adjust for superstar effects. As we have mentioned, a superstar will increase revenues through more than just on-field performance, e.g. through higher merchandise sales. We would like to value Henry from his current club's view (Equation (7)), which means we must include the correlation (ψ) between individual performance (N) and the value of a single performance point (X). Tunaru et al. (2005) estimate this correlation to be 58%.

$$rV(Y, t) = \left[\frac{\partial V}{\partial t} + DY \frac{\partial V}{\partial Y} + \frac{1}{2} B^2 Y^2 \frac{\partial^2 V}{\partial Y^2} + \lambda G(V) \right] \quad (7)$$

where

$$D = A + a + \psi b \sqrt{\sigma^2 + \delta^2 - 2\sigma\delta\rho}$$

$$B = \sqrt{b^2 + \sigma^2 + \delta^2 - 2\sigma\delta\rho}$$

Next, we will use Table 5 and our discussion over the different variables, derivatives and coefficients in our analysis of Thierry Henry. The player was in his 27th year the in the summer of 2004. He was an established player; hence he does not fit the description 'outstanding talent'. However he fits the description 'exceptional performances' and 'remarkable popularity'. It seems like Henry fits in our second column from the left in Table 5. We would thus expect a relatively low a (expected drift rate in individual performance) and b (volatility in individual performance), and a high N (individual performance). The correlation between Henry's own performance and the team's performance was 60%. As Henry had relatively consistent high performances throughout the season, we would expect both γ (expected drift rate in team performance) and δ (volatility in team performance) to be relatively low. In other words, Henry contributed to increased performance in earlier seasons,

while in season 2003-04 he contributed to keep the performance consistently high. Hence, we should expect to see a relatively high expected growth rate (α) in turnover, and a relatively low volatility (σ). Table 7 gives us the numbers (Tunaru et al. (2005); Tunaru and Viney (2010)):

ψ	0,58	ρ	0,8
α	0,07	σ	0,15
γ	0,13	δ	0,26
a	0,68	b	0,94

Table 7 Correlations, drift rates and volatilities

The biggest surprise here is the individual drift rate (a) and volatility (b) in Henry’s performance. This can be explained by Henry’s dip in form around the middle of the season, where he delivered average performances (around 1000 Opta points) for some matches. However, he pulled himself together and delivered exceptional performances during the second half of the season. His second half of the season was actually even better than his first half of the season. This can explain both the relatively high expected drift rate, and volatility in his performance.

4.3.2.3 Injuries

Thierry Henry was a popular and important player in Arsenal FC, thus he fulfilled both valuation factors. A potential injury could have had a big influence for both the performance and revenue of Arsenal FC. The loss due to injury ($G(V)$) is thus expected to be high, as a potential long injury could cost the club the championship and wipe out most of his financial contribution to the club. However, Henry was only injured one week during the 2003-04 season. The intensity parameter for injuries (λ) was therefore set to $1/52$ ($=0.019\dots$). Let us assume that Henry’s expected financial contribution to Arsenal FC was £20.3m, and that this contribution accounts for both ‘increased performance’ and ‘fan appeal’. Let us also assume that in the event of a season long injury, Henry would give no contribution to the revenue. The expected maximum loss ($G(V)$) due to injuries is then equal to the contribution ($-Y$). And the expected loss due to injuries is then $\lambda G(V)=\lambda(-Y)$. We have summarized this in Table 8:

λ	0,019
Y	20 266 200
$\lambda G(V)$	-389 735

Table 8 Injuries

We do not think our assumptions are too far from the truth, so we will use the numbers in Table 8 in our example.

4.3.2.4 The derivatives

Remember our discussion of $\partial V/\partial t$ and Figure 5, 6 and 8. We argued that using contract length (Figure 6 and 8) is better than career length (Figure 5). Henry had three years left on his contract at the end of the 2003-04 season. So, unless Henry were to sign an extension to his contract by the summer 2007 he would be worthless to the club in the summer 2007 (cf. the Bosman rule). Since we do not have enough data to calculate Henry's financial value at the time he signed the contract (the contract was signed in the summer 2003) it is difficult to say what $\partial V/\partial t$ in 2004 should be. However, we assume this number to be -£5m for Henry in the summer 2004. In other words, due to the Bosman rule Henry's value would be £5m lower the next summer, and the value would fall even more the next year, hence Figure 6 and 8. Then what about $\partial V/\partial Y$? We mentioned earlier that the contribution given by the performance value (Y) might be too high compared with the financial value (V). The contribution ($Y=NX$) does not explicitly take e.g. the popularity of a player into consideration. Arsenal might generate revenue not only explained by performance (N), for instance merchandise sales and sponsorship deals through some of the players' popularity (cf. 'fan appeal'). This revenue should be kept outside the revenue included in the financial value per Opta point ($X=T/S$). The management in football clubs should be able to do this, at least to some extent. However, we do not have that insight. One way to control this is to lower $\partial V/\partial Y$. E.g. an average player who does not contribute to more televised matches, merchandise sales and sponsorship deals will not generate much revenue, however his performance points might lead to a relatively high contribution/performance value (Y). This player should then be assigned with a low $\partial V/\partial Y$, as his Opta value (Y) is far from his financial value (V). When it comes to Henry, a star player, we would expect a relatively high $\partial V/\partial Y$. Consider two cases: If his performances would have dropped, the team's performances would have suffered (heavily), as would Henry's popularity and Arsenal's revenue. If his performance had gotten better, he would have become one of the best players in the world at that time. That would most likely have led to an even higher contribution to revenues.

By looking at Equation (7) we see that $\partial^2 V/\partial Y^2$ must be a low number to avoid explosive values of V. Given the magnitude of Y (£20.3m), and our suggestion that V(Y) is a polynomial in the second degree ($V(Y) = aY^2 + bY + c$ and $\partial^2 V/\partial Y^2 = 2a$), this comes natural:

Even a small $\partial^2 V / \partial Y^2$ will have a relatively large effect on V. As we have argued earlier, to control for any superstar effects, $\partial^2 V / \partial Y^2$ should be positive, but very small as we have seen now.

4.3.3 The financial value

All the terms in Equation (7) have now been accounted for. Let us apply the numbers from Table 6, 7 and 8, and suggest some numbers (based on the above discussion) for the derivatives $\partial V / \partial Y$ and $\partial^2 V / \partial Y^2$, and put it into Equation (7):

$\partial V / \partial t$	-£ 5 000 000
Y (Henry)	£ 20 266 200
$\lambda G(V)$	-£ 389 735
D	0,763
B	0,954
$\partial V / \partial Y$	0,300
$\partial^2 V / \partial Y^2$	8E-09
r	4,5 %
V	£ 17 000 000

Table 9 The valuation

We have used the same interest rate (4.5%) as Tunaru et al. (2005). With the numbers in Table 9, the financial value of Henry was £17m. The outcome coincides with our discussion of what $\partial V / \partial Y$ (relatively high) and $\partial^2 V / \partial Y^2$ (small and positive) should be for Henry. Without a proper financial insight in Arsenal FC, however, it is difficult to say what the numbers actually should be. One interesting connection can be drawn between the financial value calculated here and Henry's salary. A single player's salary cannot be read in the financial reports; however it is of the authors' opinion that Henry's wage was around £80,000 per week. The contract's length, signed in the summer 2003, was four years. By using a discount rate of 4.5% the cumulative wage cost of Henry would have been just above £14m, not far off the £17m calculated in the example above.

The financial value in the model (V), can be interpreted as the value of the revenue generated by a player. Note that the costs are not included. To find the net present value of Henry, we can subtract the present value of the cumulative wage costs from the financial value (V). Let us assume that the wage is paid in full at the end of each season. The net present value of Henry in the summer 2004 was then above £5.5m:

Wage pr week	80 000
Remaining time	3 years
r	4,5 %
V	17 000 000
NPV	5 564 308

Table 10 Net present value

4.3.3.1 Outside clubs

Let us move forward in time to the summer 2006. Henry signed a new four-year deal this summer. Reports claim he got £110,000 per week (Harris, 2006). A year later, in the summer 2007, Henry was sold for £17m to FC Barcelona (Tunaru and Viney, 2010). To analyze the transfer and the transfer fee, we must first describe the differences between Arsenal and Barcelona. After the successful 2003-04 season Arsenal experienced a drop in achievements. By the summer 2007 they were the 4th best team in the Premier League. In European competitions their highlight was reaching the final of the UEFA Champions League in the 2005-06 season. Barcelona, on the other hand, had consolidated their position as one of the two best teams in the Spanish Primera Division. Barcelona's European highlight was beating Arsenal in the UEFA Champions League final in the 2005-06 season. Barcelona was the most successful club of the two over the last seasons, and they also had higher revenue than Arsenal in 2006-07 (Deloitte, 2008).

As we do not have access to the performance data other than that of Arsenal in the 2003-04 season, we have to make some assumptions in the following discussion and calculations. First we assume that the clubs are quite similar: they are both among the best teams in their league, and they both usually qualify for the UEFA Champions League. To compare the two teams' performance, we will use their achievements in the UEFA Champions League as basis of comparison, as this is the only competitions were both teams participated. Interestingly their achievements over the three seasons leading up to the transfer were close to identical. Thus we can assume the two clubs to have identical performance (S), drift rates and volatilities. When it comes to player specific performance (N), drift rate, volatility and derivatives, we also assume this to be the same in the two clubs. In our view, the most notable difference is the clubs' revenues. Given our assumptions and the fact that Barcelona had higher revenue, this would give Barcelona a higher value per performance point ($X=T/S$) and a higher performance value for Henry ($Y=NX$). We argued earlier that Henry fulfilled both valuation factors in Arsenal. We will make the same argument and assumptions for Henry in Barcelona:

Henry was expected to have the same status in his new club (Barcelona) as he had in his previous club (Arsenal).

Note that the importance here is not whether these numbers and assumptions are correct, but to show how the model works. In the following table we will give a suggestion of what Barcelona's value per performance point (X) is, and the subsequent consequences it has on Henry's performance value (Y) and financial value (V). The only differences from the previous example are X, Y, G(V) and V:

X (Barcelona)	£	450
S (Barcelona)		415000
N (Henry)		48600
$\partial V/\partial t$	-£	5 000 000
Y (Henry)	£	21 870 000
$\lambda G(V)$	-£	420 577
D		0,763
B		0,954
$\partial V/\partial Y$		0,300
$\partial^2 V/\partial Y^2$		8E-09
r		4,5 %
V	£	30 020 553

Table 11 Barcelona's valuation of Henry

(We refer to our comments on the correlation (ψ) as to why we use D as drift rate, and not $A+a$.) The only difference between Barcelona and Arsenal's valuations is the value per performance point (X). For Arsenal this was £417, while we have set $X = £450$ (converted from euro to pound) for Barcelona due to their higher revenue. This leads to a higher performance value (Y), injury-loss ($\lambda G(V)$) and financial value (V). Remember the club specific factors for revenue. One interpretation of why Barcelona value Henry higher than Arsenal can be their ability to generate more revenue. This can for instance be the nature of their television deals, spectator capacity both at the stadium and television, and their status in geographical areas, like Asia and North America. Given that Barcelona's revenue generating abilities are higher than Arsenal's, Henry will generate more revenue for Barcelona than for Arsenal. In our example Arsenal value Henry to £17m, while Barcelona value the same player to £30m.

Later we will use this example in our bargaining framework to argue what price Henry could have been sold for. In our bargaining framework, we will use the IR (increased revenue) and DR (decreased revenue) variables instead of V. As it is Arsenal that sells the player they will

“lose” the revenue generated by this player, so $DR = \text{£}17\text{m}$. Barcelona buys the player, so they will gain the revenue generated by Henry; $IR = \text{£}30\text{m}$. The bargaining framework will also take the costs, like wages, into account.

We have now answered research topic 1 with an example. Next, we want to find out how much a football club has to pay for the player.

5. Research topic 2: How much will the club have to pay for the player?

In answering the first research topic we have made an effort to describe and quantify the increased revenue variable (IR) and decreased revenue variable (DR) in the NPV conditions. The other three factors in the buying club’s NPV condition are negotiable costs (e.g. transfer fee (T) and salary), non-negotiable costs (e.g. financing costs) and the lower limit; and the three other factors in the selling club’s NPV condition are the transfer fee, costs (e.g. salary and financing costs) the club save if the transfer goes through, and the lower limit:

$$NPV_{BC} = IR - NC - nonNC \geq Lower\ limit_{BC}$$

$$NPV_{SC} = T - DR + costs \geq Lower\ limit_{SC}$$

Let us repeat what we know about the NPV conditions: Apart from IR and DR, the biggest and most important sizes are transfer fee and salary. For the selling club the only unknown variable is the transfer fee; the costs, including salary and financing costs, and lower limit are known. For the buying club we will assume that transfer and salary are the only unknown variables; the CFO, or whoever is in charge of the financing decisions, will know the lower limit, how expensive the financing is and what other costs will accrue in the transfer. In addition, we assume that the clubs know each other’s increased/decreased revenue, costs and lower limits; i.e. there is complete information concerning these variables. We will, therefore, only focus on the transfer fee and salary paid in the buying club in this part of the thesis, the other variables are already known at this stage. Formally:

$$NPV_{BC} = (IR - known\ costs_{BC}) - T - S_{BC} \geq Lower\ limit_{BC}$$

$$NPV_{SC} = T - (DR - known\ costs_{SC}) \geq Lower\ limit_{SC}$$

So the focal point in this, final part of the paper will be on the variables outside the parenthesis: transfer fee (T) is negotiated between buying and selling club, and salary in buying club (S_{BC}) is negotiated between the buying club and the player.

In the introductory example we did an effort to decide transfer fee by using a bargaining model loaded with assumptions and stripped for participants (Rubinstein 1982). Obviously, we will need to find another model that suits the real world better: allowing for more than two participants, include tax differences between different countries, include characteristics of clubs, players and market structure, etc. This is how we are going to do that: First we will go through relevant literature and see how the determination of transfer fee and salary is handled in the academic world; then we will evaluate that insight, augment it with our own considerations and merge it all together in a framework that shows how the transfer fee and salary should be decided, given the parties' bargaining power. Consequently, in order to make use of that framework, we will have to find the factors that decide the parties' bargaining power and analyse them. In fact, most of the attention in this part of the paper will be given to that task, i.e., finding and analysing the bargaining factors.

In our argumentation and model creation process, we will make extensive use of examples to show that our assumptions and considerations are anchored in the real world. Finally, we will use the bargaining model to look at the transfer of Thierry Henry from Arsenal FC to FC Barcelona. The bargaining model will tell us what the transfer fee and salary should have been (from our point of view, at least). By comparing the results from our models with those of the real world we can see which party or parties that gained from the transfer.

5.1 Literature review

In 1956, Rottenberg posted the following question about player salaries: "If baseball players have, on the average, no skills other than those necessary to play baseball proficiently, then their next best wage would be relatively low. Why are they paid so much more?" On transfer fees, Rottenberg (1956) had the following view, which is the same as our view:

The selling price will be not less than the player's capitalized value to the team that owns his contract [this is the transfer condition]. It will not be more than his capitalized value to the team for which his product would be higher than for any other team. The price will fall between these limits, at a point determined by bargaining strategies and the player's capitalized value to other would-be buyers [this is the NVP condition].

In the following we will hopefully be able to give a more precise description of the processes determining the transfer fee and the player salary.

The literature on the field is scarce and older articles are more or less outdated because of recent changes in the football players' labour market, as explained earlier (the Bosman-verdict, etc.); but some general insight can be obtained. Carmichael and Thomas (1993) describe a two-party bargaining situation with the buying and the selling club as participants. They check empirically if they can use the method of Nash (1950, 1953) which they call the Nash bargaining solution. The Nash bargaining solution is the transfer fee, f^* , "which maximizes the product of utility increments; $[S(f) - s][B(f) - b]$, where S and B are the expected utility functions of the selling and buying club, respectively, and s and b are their status quo, disagreement or threat points" (Carmichael and Thomas, 1993). Put another way: attributes about the player, the player's importance for the selling club, and the teams' bargaining power affects the negotiation outcome. This point of view is also taken by Dobson and Gerrard (1999, 2000) and Speight and Thomas (1997). Using proxy variables for player ability (age, goals scored, etc.), buying club's bargaining power (position in the league, attendance, pre-tax profit, etc.) and selling clubs' bargaining power (same variables as buying club) Carmichael and Thomas (1993) test, using transfer data from the 1990-91 season in the English leagues, whether or not the Nash bargaining solution holds. Their conclusion is that the Nash bargaining model can be used to explain important factors determining the negotiation outcome in the English transfer market. The selling club's bargaining power is determined by the player's importance for the club, i.e. "ability and crowd-pulling power". For the buying club, bargaining power is determined by the club's size and playing success in the sense that big and/or successful teams have less bargaining power (they pay relatively higher transfer fees than other clubs). The authors (Carmichael and Thomas, 1993) explain this by increased risk-aversion among big and successful teams, i.e., they are afraid of performing bad and losing reputation so they are willing to pay more for the players. Also, the big clubs often compete for the same players, further reducing their bargaining power in the negotiation over the transfer fee.

This latter point is investigated and expanded further by Garcia-del-Barro and Pujol (2007) by using data from the Spanish top divisions. But they take a different perspective; they look at the determination of the player's wage after a transfer fee has been decided. Effectively, they examine the bargaining power of the player and the buying club in a competitive setting (the selling club is excluded from the analysis). The authors (Garcia-del-Barro and Pujol, 2007) claim the football labour market contains two groups of players: the average players which are abundant, and the "superstars" which are few. In the first group the football clubs has

monopsony power because the clubs are relatively few compared to the huge mass of players with average talent. According to economic theory, the clubs should then be able to extract monopsony rents from that group of players. On the other hand, the superstars are relatively few compared to the number of clubs that want to hire them; so the superstars are able to obtain monopoly power in the labour market and therefore extract monopoly rents. In the words of the authors (Garcia-del-Barro and Pujol, 2007): "[...] rich teams will get big superstars and poor clubs get small ones." Then they proceed to create a framework where players are paid for both sporting contribution and merchandising contribution; and, following the tradition in the literature, the clubs are not pure profit maximisers but utility maximisers, and choose the level of superstars according to that. The result is that the monopsony rents extracted from the mass of average players are paid out as monopoly rents to the few superstars, yielding zero profits for the clubs. In our terms, the NPV condition is fulfilled on average: superstars transfer in area 2 and the other players transfer in area 3 (see Figure 1). Even if the analysis is performed on the Spanish league the authors (Garcia-del-Barro and Pujol, 2007) claim general validity of their results, i.e., the football labour market is divided in two groups of players. Another view is taken by Rottenberg (1956). He justifies extraction of monopsony rents from team players because the clubs make costly investments in development of young talents, some of which never become good enough for the first team and thereby inflict losses to the clubs.

Gerrard and Dobson (2000) use the argument of football clubs' monopsony rent extraction from players' services as a starting point for investigating the transfer fee. In their one period model, the value of a player for a team is the difference between the marginal value of that player's talent to the club and actual wages paid. (Under profit maximisation, that equals marginal revenue product less actual wages paid.) The selling club has to be compensated for this loss in order for a transfer to take place, just as in our introductory example. The same reasoning is used for the buying club: it is not willing to pay more than the monopsony rent it can extract from the player's services. Actual transfer fee will then lie in this interval depending on characteristics of the player and the teams. Then, using empirical data from 1990-96, they find evidence of monopoly rents extracted from the buying club to the selling club, i.e. the transfer fee is higher than the minimum transfer fee (see Figure 2 and 3); but they do not find out which mechanisms that decide the degree of monopoly rents.

Carmichael, Forrest and Simmons (1999) discuss which player characteristics that affect the probability of a transfer. They find that "The probability of transfer is highest for more

experienced players who can score goals and who may have been on loan but have not as yet a long transfer history.” Another interesting hypothesis they post is that the remaining time of the contract can affect the transfer fee, but they do not have data to test this.

Another focus in the literature is the effects the Bosman ruling, which we explained in the introduction, has on the price of the player and his wages and incentives to invest in player talent. In Rottenberg’s (1956) theoretical paper on sports economics he introduces the invariance principle we explained under ‘Models for football club behaviour’: the allocation of player talent is efficient under both the free market system and the reserve clause (retain and transfer) system. The difference is that under the free market system the players get their full value because no transfer fee is paid. What distinguish a free market system from the “Bosman system” is that a transfer fee still has to be paid for under-contract players. People in the football industry, however, thought the Bosman verdict was the end of transfer fees: “Pronouncements from a number of people in the soccer world in the wake of the Bosman judgement were indicative of the belief that transfer fees themselves would no longer be payable under any circumstances” (Antonioni and Cubbin, 2000). Time has proved them wrong; transfer fees are still paid. Experts have nevertheless expressed their concerns concerning the incentives to develop players after the Bosman verdict (Feess and Muehlheusser, 2003).

Main findings are summed up in the table below.

Author	Method	Interesting findings
Carmichael and Thomas (1993)	Transfer fee negotiation with two parties: buying and selling club. Bargaining equilibrium.	Player, selling and buying team characteristics affect the bargaining power of the buying and selling clubs.
Carmichael, Forrest and Simmons (1999)	What factors affect the probability of a transfer	Remaining time of contract may affect the transfer fee
Garcia-del-Barrio and Pujol (2007)	Wage negotiation with two parties: buying club and player. Competitive equilibrium.	Buying club extracts monopsony rents from average players but has to pay them out again as monopoly rents to superstars.
Gerrard and Dobson (2000)	Transfer fee negotiation with two parties: buying and selling club. Competitive	On average, the selling clubs are able to extract monopoly rents from the buying clubs.

	equilibrium.	
Antonioni and Cubbin (2000)	The effects of the Bosman ruling on investment decisions for clubs	Transfer fees are still paid. Incentives for investing in player talent are not changed.
Feess and Muehlheusser (2003)	The effects of the Bosman ruling on wages, profits, contract length and investment decisions for clubs	Players' overall payoff is reduced because of clubs' renegotiation power. Free riding on other clubs' investment in talent lowers investment in talent.

Table 12 Main findings from literature on transfer fee and wage determination

5.2 Interdependencies and different market structures need to be accounted for

One shortcoming we find in the literature is the negotiation setting: the authors look at the transfer fee negotiation and the wage negotiation as independent processes not affecting each other. In doing so, they possibly miss some key features of the transfer market, namely that the two negotiations can influence each other. Remember what we wrote about the transfer process under ‘The transfer from A to Z’: transfer fee and wage are decided sequentially. So, if the selling club has monopoly power and is able to extract a high monopoly rent from the buying club, the player will lose a lot of his bargaining power in the wage negotiation because of the transfer deals’ sequential structure, raising the probability of a break down in the transfer. Metaphorically speaking, the selling club will eat the pie before the player has a chance to sit down at the table.

In other situations the sequential negotiation of transfer fee and wage will not be a problem. E.g. when the buying club has bargaining or monopsony power over both the selling club and the player, the sequential determination will not affect the outcome: the transfer will go through at minimum transfer fee and minimum salary (see Figure 3). Yet another example is the effect of the Bosman verdict: if a player wants to join another team because of higher wages or higher sporting performance, and that team happens to also want the player, he can force his current club to sell him at the minimum transfer fee, i.e. the transfer fee that satisfies the selling club’s NPV condition, to the other club, using the threat that he will leave for free when his contract is expired.

Another shortcoming we find in the literature is the market structure some of the articles assume to reach their conclusions. We do not want to assume that one market structure is valid for all transfers in our model: Some transfers can be explained as a competitive process

with many competing bidders, while other transfers have only one bidder and one seller where the outcome depends on the bargaining power of the participants.

In our framework describing the determination of negotiable costs, we want to consider the interdependencies between the parties and the different market structures that can arise in the transfer market. The participants in the transfer market – the player and the clubs – will then have to identify the conditions in which they operate and then choose the appropriate model for determining transfer fee and wages. The figure below (Figure 9) summarises our findings and gives a general explanation to how transfer deals are decided.

From the buying club's point of view								
1. Identify player that satisfies the NPV-condition using the framework								
2. Which club has bargaining or market power in the transfer fee negotiation?								
Selling club			Neither			Buying club		
3. Which party has bargaining or market power in the wage negotiation?								
Player	Neither	Buying club	Player	Neither	Buying club	Player	Neither	Buying club
1	2	3	4	5	6	7	8	9
<p>1. Worst scenario for buying club. Buying club will have to offer transfer fee and salary at the lower limit. Transfer may break down if the selling club abuse their bargaining or market power so much that there is no “pie” left for the player, or vice versa. Formally:</p> $NPV_{BC} = (IR - \text{known costs}) - T - S_{BC} = \text{Lower limit}_{BC}$ $NPV_{SC} = T - (DR - \text{costs}) \gg \text{Lower limit}_{SC}$								
<p>2. Buying club will have to pay a high transfer fee to the selling club. In the wage negotiation, neither party has an advantage so buying club should be able to get NPV greater than or equal to lower limit depending on the transfer fee paid to the selling club. Formally:</p> $NPV_{BC} = (IR - \text{known costs}) - T - S_{BC} \geq \text{Lower limit}_{BC}$ $NPV_{SC} = T - (DR - \text{costs}) \gg \text{Lower limit}_{SC}$								
<p>3. The buying club can extract rent from the player but it has to pay a high transfer fee to the selling club. Perfect scenario for the selling club, they can get high transfer fee without risking a break down in the transfer. Formally:</p> $NPV_{BC} = (IR - \text{known costs}) - T - S_{BC} \geq \text{Lower limit}_{BC}$ $NPV_{SC} = T - (DR - \text{costs}) \gg \text{Lower limit}_{SC}$								
<p>4. Since neither of the clubs have bargaining power in the transfer fee negotiation, the negotiated transfer fee should satisfy both parties. The player has bargaining power in the wage negotiation so the buying club's NPV will be greater than or equal to its lower limit depending on how much salary the player demands. Formally:</p>								

$$NPV_{BC} = (IR - \text{known costs}) - T - S_{BC} \geq \text{Lower limit}_{BC}$$

$$NPV_{SC} = T - (DR - \text{costs}) > \text{Lower limit}_{SC}$$

5. In this scenario none of the parties have bargaining or market power. The transfer should therefore make everyone better off.

Formally:

$$NPV_{BC} = (IR - \text{known costs}) - T - S_{BC} > \text{Lower limit}_{BC}$$

$$NPV_{SC} = T - (DR - \text{costs}) > \text{Lower limit}_{SC}$$

6. Since neither of the clubs have bargaining nor market power in the transfer fee negotiation, the negotiated transfer fee should satisfy both parties. The buying club has bargaining power in the wage negotiation so the buying club's NPV will be greater than its lower limit depending on how high rent the buying club extracts from the player. Formally:

$$NPV_{BC} = (IR - \text{known costs}) - T - S_{BC} > \text{Lower limit}_{BC}$$

$$NPV_{SC} = T - (DR - \text{costs}) > \text{Lower limit}_{SC}$$

7. Buying club will have to pay high salary to the player but it can pay a relatively low transfer fee to the selling club. Perfect scenario for the player which can take a big piece of the "pie". NPV of buying club depends on how high salary the player demands. Formally:

$$NPV_{BC} = (IR - \text{known costs}) - T - S_{BC} \geq \text{Lower limit}_{BC}$$

$$NPV_{SC} = T - (DR - \text{costs}) = \text{Lower limit}_{SC}$$

8. Buying club can pay low transfer fee to the selling club. Neither player nor buying club have bargaining or market power in the wage negotiation so they should reach a solution both are happy with. Formally:

$$NPV_{BC} = (IR - \text{known costs}) - T - S_{BC} > \text{Lower limit}_{BC}$$

$$NPV_{SC} = T - (DR - \text{costs}) = \text{Lower limit}_{SC}$$

9. The buying club can exploit both player and selling club. Perfect scenario for the buying club. They can get a big piece of the "pie". Formally:

$$NPV_{BC} = (IR - \text{known costs}) - T - S_{BC} \gg \text{Lower limit}_{BC}$$

$$NPV_{SC} = T - (DR - \text{costs}) = \text{Lower limit}_{SC}$$

Figure 9 The parties' bargaining power decides who gains from the transfer

With this framework in hand we have a powerful tool for determining the transfer fee and wage. It can also be used to identify which parties will gain the most from the transfer. The challenge is to identify the factors or scenarios that determine the bargaining or market powers (bargaining powers from here on) so we can fully utilise the framework. So far we have mainly described those factors or scenarios in general, saying that the characteristics of the market, clubs and player determine the bargaining outcome. Now, we will look into what these characteristics actually are – we have already mentioned one: the player wants to leave.

5.3 Factors determining bargaining power

We start our search for the bargaining power-factors with an example of two factors that does *not* affect bargaining power: “the player is important for the club’s performance so we need a high price” or “the player faces strict labour market regulations so we are not willing to pay that much” (For EU/EEA (EU from now on) clubs this factor applies to the case of signing non-EU players. We will not consider the opposite because EU players rarely transfer to non-EU clubs. As we mentioned in the introduction (under the headline ‘The Bosman ruling’) players from outside EU often face stricter regulations). Arguments like those will not affect bargaining power because they are already accounted for in ‘The valuation model’ through the player’s revenue contribution in the current and buying club, respectively. Therefore, minimum transfer fee will contain these effects. In fact, we have already covered many factors that one might think affect bargaining power. Other examples include: “player has remarkable popularity among the consumers”, included in ‘fan appeal’; “player has low fluctuations in performance”, included in player’s variance rate (b^2) in individual performance (N); “player makes the other players better”, included in higher drift rate (γ) in team performance (S) through externalities; “player is approaching the end of his contract”, included in the value function, $\partial V/\partial t$. If there are no substitute players, however, that is another case: it is not accounted for thus far and will clearly affect bargaining power: It is difficult to replace the player for the selling club, and the buying club will have difficulties to find other, similar players.

By identifying factors affecting bargaining power – we will certainly not be able to identify all – we can extend the insight from the ‘Valuation factors framework’ and ‘The valuation model’ into a complete pricing framework for football players. We will group the factors affecting bargaining power into four groups: 1) Player specific factors, e.g. the player wants to move; 2) Selling club specific factors, e.g. financial difficulties; 3) Buying club specific factors, e.g. the club has win at all cost-owners; and, finally, 4) Competing bidder specific factors, e.g. there are many clubs wanting the player. The three first groups will explain all scenarios where there are only one buying club while inclusion of the fourth group lets us analyse all scenarios where there are more buyers. Hence, we will have to create two matrices; and these matrices will enable us to determine transfer fee and wage through Figure 9.

Without further ado, here are our factors determining bargaining power.

5.3.1 Player specific factors

The player specific factors contain characteristics about the player and his current situation. As we shall see, these factors can affect the bargaining power of the player as well as the selling and buying club.

5.3.1.1 Does the player want to leave his current club?

What the player wants – to stay or leave – is a big determinant when deciding bargaining power. Even though a player has to respect his contract, he still has a big influence over his club. There are numerous examples of players going public about their wish to move. Sometimes a player wants to move because he does not think he is playing enough matches; sometimes the player wants to move because he wants to be at a better, bigger or personally preferred team. The latter was the case with Cristiano Ronaldo, the current world record holder in transfer fee (as explained in the introduction). He said that “I’d like to play for Real Madrid but only if it’s true they are ready to pay what Manchester United ask of them. [...] However, it does not depend on me” (BBC, 2008a). In the end, despite Ronaldo’s claim, his move to Real Madrid probably depended a lot on him and what he said: Manchester United did not want to sell him – Ronaldo had four years left of his contract with them – and threatened to report Real Madrid to FIFA for ‘tapping up’ (see “The transfer from A to Z”) Ronaldo (BBC, 2008b). The case got so heated that even the FIFA president, Sepp Blatter, gave a statement:

I’m always in favour of protecting the player and if the player wants to leave let him leave. If the player wants to play somewhere else, then a solution should be found because if he stays in a club where he does not feel comfortable to play then it’s not good for the player and for the club. I think in football there’s too much modern slavery in transferring players or buying players here and there, and putting them somewhere. We are trying now to intervene in such cases. (BBC, 2008c)

Blatter’s statement clearly supports the players. *Ceteris paribus*, then, if the player wants to leave, the selling or current club loses bargaining power over the player: it would have to offer a better contract in order to induce the player to stay. If there is another club wanting the player (and the player wants to join that team), that club will also gain bargaining power over the selling club, as we have already mentioned. E.g. if the player is in his last year of contract, he can refuse to accept any new contract proposals from his current club and move for free at the end of his current contract. Waiting is then profitable for the buying club if the transfer fee

required is higher than the value of the lost cash flows, or opportunity cost, incurred by not signing the player right away.

If the player has some years left of his contract the current club is probably best off by selling the player anyway, to avoid unsettling the player and/or the whole team, and to avoid bad publicity. All in all, if the player wants to move, the selling club loses bargaining power.

The opposite also holds: if a player does not want to leave, the current club will gain bargaining power over the player in wage negotiations and over potential buying clubs in transfer fee negotiations, *ceteris paribus*. A player not wanting to leave can also sign a new long-term contract with his current club, e.g. five years, and hence increase his value to the current club through a higher decreased revenue (DR) or $V(t)$ because of extended investment horizon (Figure 10). This can make the transfer break down through a violation of the buying club's NPV condition: The minimum transfer fee the buying club has to pay, i.e. the transfer fee that satisfies the selling club's NPV condition after a new contract is signed, will be too high to satisfy the buying club's NPV condition.

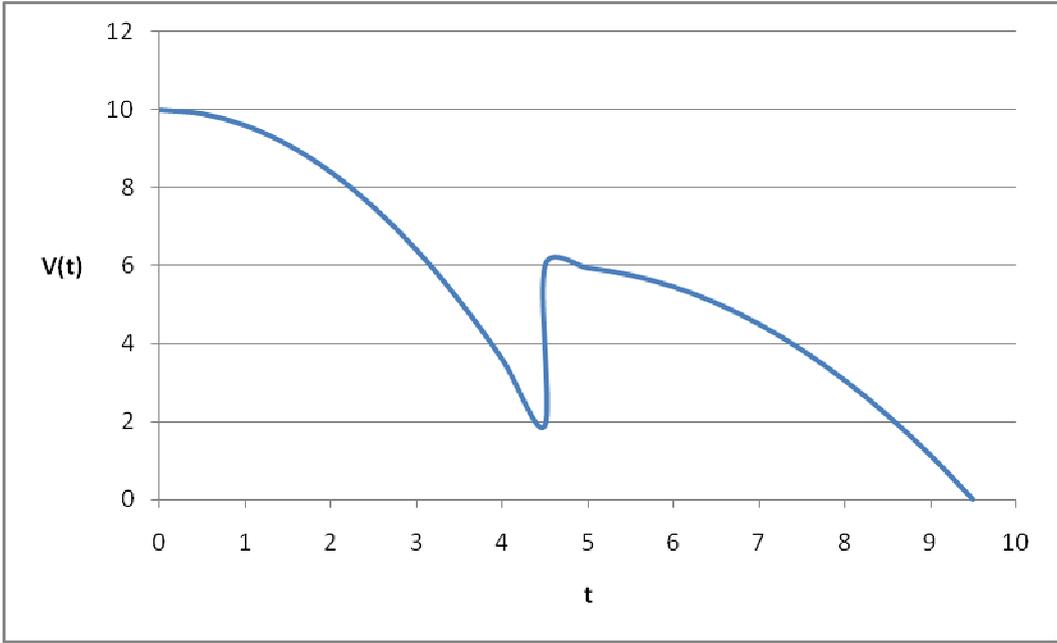


Figure 10 Player renews contract after 4.5 years

Figure 10 shows a scenario where a player renews his 5-year contract after 4.5 years (compare it with Figure 6). The player's value to the current club will then increase to a higher level (here it is assumed to be around 6) immediately after the player signs the new contract. This forces the clubs to recalculate their IR, DR and cost variables. Signing a new contract will therefore not affect the bargaining power *ex post* because 'The valuation model' will capture

the changes. Ex ante, however, the selling club can increase their bargaining power through a threat of offering the player a new contract.

Other players again are more or less indifferent to where they are playing. Bargaining power will then be explained better with other factors.

5.3.1.2 Are there substitute players?

Probable answers to this question are ‘yes’, ‘no’ and ‘some’. Later we will see that this factor, together with “Competing bidder specific factors”, determine the market structure in which the transfer takes place. If there are no substitutes, we are often talking about a superstar. Not surprisingly, a player like this will have bargaining power over potential buyers, *ceteris paribus*, in the wage negotiation, no matter how many buyers there are; and the current club will have bargaining power over the (competing) buying club(s), *ceteris paribus*. Again, we can use the example of Cristiano Ronaldo: Manchester United managed to get a world record breaking transfer fee of €94m and Ronaldo signed a very lucrative contract, currently making him the second highest earner in football (Eurosport, 2011).

If there are many substitute players, each selling club and player lose bargaining power, *ceteris paribus*, no matter how many buyers there are. When there are ‘some’ substitute players we need to know how many buyers there are to determine the bargaining power.

5.3.1.3 Income tax, currency, culture, climate and language

International transfers where players move to a club in a different country is quite normal in football today (Kessenne, 2007), but the differences between different countries have not been a focus in the literature. In international transfers factors such as exchange rates, income tax, climate, language and culture play a part in determining the player’s wage. After Britain increased the income tax rate in April 2010 – “From April 2010 a new rate of Income Tax of 50 per cent will apply to income over £150,000” (Directgov, 2010) – several big names in football expressed their concern. “Arsene Wenger, the Arsenal manager, predicted back in April that ‘the domination of the [English] Premier League will go’ because of the government’s tax policy [...]” (White, 2009). This view, that football players are drawn to countries with favourable tax regulations, is also supported in the academic world (Kleven, Landais and Saez, 2010). We can therefore state that a club in a country with an advantageous income tax rate, compared to competing buying clubs, will gain bargaining power over the player in the wage negotiation, if the player currently plays in a country with relatively higher income taxation.

The difference in currency can be a deciding factor because a footballer's career is relatively short, and most of the players can only dream of earning the same amount of money after their playing career, so they have to save money to maintain their standard of living after their football careers. Receiving your salary in another currency than your home currency, then, (e.g. Spanish player in England moving back to Spain after his career in England) can give you a currency loss if the euro is appreciating. A club with a relatively stronger or appreciating currency will then gain bargaining power in the wage negotiation.

Culture, climate and language can play a big role in deciding a player's well-being. Hence, these factors matter when a player is facing a possible transfer. *Ceteris paribus*, a buying club with "worse" culture, climate and language than the player's current club will then lose bargaining power in the wage negotiation, because they have to compensate the player for moving to the club. These factors can also help explain movement patterns: The concentration of Brazilian players in Europe is highest in Portugal, and the concentration of Argentinean players in Europe is highest in Spain and Italy (Eurorivals, 2011).

5.3.1.4 Determining the bargaining power

We have now explained the main player specific factors determining bargaining power. Again we point out that there are probably many more factors as well, but the ones we have presented here should give useful insight. Additional factors can easily be added anyway. In order to find out which parties have bargaining power, as we mentioned over, we need to put the factors in a matrix because they affect each other. So, before we explain the other three groups of specific factors we will illustrate the insight gained thus far – again by using the case of Cristiano Ronaldo – by putting the player specific factors in a matrix (Figure 11).

In the figure, we are looking at the situation from Real Madrid's point of view. It is read row by row, taking one factor combination at a time. A blue cell indicates that the combination of the two factors gives Real Madrid bargaining power; an orange cell means that the combination of the cells creates an ambiguous or neutral outcome; and a red cell indicates that the combination of the two factors gives Manchester United or Cristiano Ronaldo bargaining power. The relevant combination is marked with an "X". For each combination of factors there is a row for selling club (SC), Manchester United, and a row for the player (P), Cristian Ronaldo.

The first factor is "Player wants to move". In this case, the answer is "Yes". Then we move on to see how this affects the bargaining power of SC and P, respectively, in combination with

<i>Evaluating bargaining power from Real Madrid's point of view</i>			Player specific factors														
			Player wants to move			Substitute players			Current tax for player			Current culture, climate and language situation			Current wage currency		
			Yes	Indif.	No	Yes	Maybe	No	Higher	Same	Lower	Better	Same	Worse	Better	Same	Worse
Player specific factors	Player wants to move	Yes	Brgn pwr over SC			X	X						X			X	
			Brgn pwr over P			X	X						X			X	
		Indifferent	Brgn pwr over SC														
			Brgn pwr over P														
		No	Brgn pwr over SC														
			Brgn pwr over P														
	Substitute players	Yes	Brgn pwr over SC														
			Brgn pwr over P														
		Maybe	Brgn pwr over SC														
			Brgn pwr over P														
		No	Brgn pwr over SC														
			Brgn pwr over P														
	Current tax for player	Higher	Brgn pwr over SC														
			Brgn pwr over P														
		Same	Brgn pwr over SC														
			Brgn pwr over P														
		Lower	Brgn pwr over SC														
			Brgn pwr over P														
	Current culture, climate and language situation	Better	Brgn pwr over SC														
			Brgn pwr over P														
		Same	Brgn pwr over SC														
			Brgn pwr over P														
		Worse	Brgn pwr over SC														
			Brgn pwr over P														

Figure 11 Determining bargaining power in the Ronaldo transfer

“Substitute players”. Here there are no substitute players, so the outcome is ambiguous for both SC and P: One factor is advantageous for Real Madrid and the other factor is advantageous for Manchester United and Cristiano Ronaldo.

The British tax is higher than the Spanish tax (BBC, 2009b), but income taxation does not affect the bargaining power between the clubs. Hence, Real Madrid will gain bargaining power over Manchester United in this combination of player specific factors. Since Ronaldo both wants to leave and have higher current income taxation, he will lose bargaining power in the wage negotiation. We can use the same argumentation for the next two factors: They do not affect the clubs’ bargaining power over each other so the combination with “Player wants to leave” gives advantage to Real Madrid over Manchester United. For the Portuguese Ronaldo, culture, climate, language and wage currency will all be better in Spain (at least we think so!); giving Real Madrid bargaining power over the player.

So far it looks like it is advantage Real Madrid.

Next factor-row is “Substitute players”. The answer is “No” as we already know. Combining this with three factors not affecting the clubs all give the same answer: Manchester United will gain bargaining power over Real Madrid in the transfer fee negotiation. For Real Madrid vs. Ronaldo, all the combinations give ambiguous outcomes: “No substitutes” gives Ronaldo the advantage while the other factors give Real Madrid the advantage. However, we think that “no substitutes” weighs more than the other factors so the colour could be red instead.

The bargaining powers are evening out: Real Madrid’s earlier advantage over both Manchester United and Ronaldo is disappearing.

We have three combinations left and none of them affect the bargaining power between the clubs, so it does not seem like the player specific factors give a bargaining advantage to one club over the other. This is reflected in the transfer fee (even though it is very high): The transfer gave both clubs positive NPV (The Telegraph, 2010). Since we assume that Ronaldo prefer Spain over Britain because of lower tax, more familiar culture and language, better climate and preferred currency (euro preferred over pound sterling), we can conclude that Real Madrid will gain some bargaining power over Ronaldo for these three combinations of player specific factors. In total, then, it seems like Real Madrid has some (but not much) bargaining power over Ronaldo. By looking at Figure 9, our framework, we are in scenario 5 or 6. These scenarios are consistent with Ronaldo’s transfer being profitable for Real Madrid

and Manchester United, and they are also consistent with Ronaldo being the second highest earner in football: All three parties are better off by the transfer. The player specific factors, then, seem to describe most of the factors deciding bargaining power and, hence, the bargaining outcome in the transfer of Cristiano Ronaldo.

Other transfers, as we will see, are more complex than the Ronaldo case and require a more thorough analysis including more factors.

5.3.2 Selling club specific factors

By extending the player specific factors with selling club specific factors we add some pieces to the puzzle that is the determination of bargaining power. These factors account for special characteristics of the selling club that are not included in our previous analysis. Again, we do not claim that we will find all the factors: these are selections of the factors we think are important.

5.3.2.1 Does the club need to sell players for financial reasons?

Many clubs are in financial difficulties with high salary expenses and high levels of debts (Drut and Raballand, 2010). In order to service their debt, wages and other obligations many clubs rely on player sales to stay solvent. Consequently, a selling club being in a difficult financial position can give the buying club an advantage in the transfer fee negotiations. Leeds United's downfall, mentioned in the introduction, is a good example of this: In July, 2001, Leeds signed Robbie Keane for €18m. In December the same year, another Robbie – Robbie Fowler – was acquired for €16.8m. About one year later both of them had been sold for €10.5m and €9.8m (Transfermarkt, 2011a; Transfermarkt, 2011b), respectively, in what can only be described as a fire sale.

5.3.2.2 What is the selling club's philosophy?

This is an interesting topic that certainly deserves more attention than we are able to give it here. It concerns the owner's strategy for how to maximise the object function. Some owners are willing to win at any cost while others prefer to operate in a more sustainable way. Company and ownership structure, corporate governance and corporate finance issues are central topics here. We allow ourselves an anecdote: Real Madrid, FC Barcelona and Manchester United are the three clubs with the highest revenues in the world, according to Deloitte (2011). While Manchester United is a private company, owned by the American Glazer family (Kelso, 2011), Real Madrid and FC Barcelona are owned by their vast member bases. These members choose the clubs' presidents in democratic elections every four years.

[Barcelona can] not raise finance through a stock-market flotation or a private capital injection. It can only raise money by tapping its fans. So club members between 2003 and 2010 were almost doubled to over 170,000, via what it called The Big Challenge (El Grand Repte). [...] A major criticism of the mutual business model, for example in financial services, is that despite the oft-stated commitment to member democracy, there can actually be less accountability to members by the mutual board than in a traditional private company because membership is so dispersed. At Barcelona this has not been a problem thanks to the natural tendency of the fans to be emotionally engaged in the club. [...] Such member power and activism is not always the case. Over at mutually owned Real Madrid, a less engaged membership has seen successive club presidents rule in a semi-aristocratic style. These bosses spend heavily on players the club cannot really afford only to be bailed out by public authorities. Taxpayers, in other words. Ultimately, the best argument for mutual ownership is that football clubs are already de facto not-for-profit institutions [...]. But as Real Madrid illustrates, mutuality alone is not enough. What the Barcelona experience tells us is that the mutual model, when combined with top-class business practice, through a partnership with club supporters, can offer a sustainable alternative to the private ownership model. (Hamil, 2010)

The presidential election campaigns in Real Madrid are often characterised by promises of buying certain star players. In fulfilling those promises, Real Madrid gave away a lot of bargaining power to the clubs that currently held the targeted players. This has resulted in Real Madrid holding the top four spots on the list of highest transfer fees in the world (BBC, 2009a).

You can argue that a win-at-any-cost philosophy will be reflected in a relatively low 'lower limit' (i.e. negative) in the NPV condition, while a more sustainable strategy will be reflected in a relatively higher 'lower limit'. That is true: Owner philosophy is one of the factors determining the 'lower limit' and hence already accounted for. Until the UEFA Financial Fair Play rules become stricter (around 2018), different lower limits will be an important variable in the transfer market. But owner philosophy will also determine the inclination to reach the 'lower limit', regardless of how low or high it is, and that is not accounted for yet. Win-at-any-cost owners will, *ceteris paribus*, be more inclined to sign and/or sell players at the 'lower limit', clearly giving the other parties an advantage in the negotiations.

5.3.2.3 Does the owner/club want to keep the player?

This is another “Yes/No/Indifferent” question and, as the case is so often with football, it concerns feelings more than revenues. Have in mind: If the player is causing the club to lose money, i.e. his revenue contribution is less than his salary, this will already have been accounted for in the DR and ‘costs’ variables and, thus, this will not affect bargaining power. But there can also be other reasons why a club wants to sell a player, even if he is profitable: He can have fallen out with the club’s manager or coaches; he can be a victim of a new strategy for the club; or he can be too old, etc. The club can then offer the player to other clubs (cf. ‘The transfer process from A to Z’) for a low transfer fee, giving the other club bargaining power over both selling club and player.

Some clubs also practice a policy of selling players that think they are “bigger than the club” in order to demonstrate that nothing or no one is, indeed, “bigger than the club”. Arguably the most famous football player in the world, David Beckham, experienced this when he was sold from Manchester United in the summer of 2003 (Palmer, 2003). He went to Real Madrid (no surprise there).

5.3.3 Buying club specific factors

Factors that are best explained as characteristics of the buying club will be explained here. However, from now on we will see that our analysis of bargaining power becomes increasingly more complex and that the borders between the groups sometimes are erased. Consequently, after we have presented this group we will merge and regroup the factors into a useable framework for determining bargaining power.

5.3.3.1 Does the player want to move to the club?

This factor can be seen as an interaction term with the “Does the player want to leave”-factor, and in our matrix we will combine them to one factor. It captures the player’s feelings towards the buying club. E.g. if the player wants to leave his current club because he wants to play more matches but he does not like our club, even though we can offer him more playing time and more money, the bargaining advantage over the player is wiped out. In fact, it is probably a deal breaker and the club should give up any further pursuit for the player. Remember our earlier quote:

“The challenge for economic theory is to find a dynamic balance between love and money necessary to analytically grasp the passionate and pragmatic complexities of the beautiful game” (Vrooman, 2007a).

An example where feelings were involved was the transfer of Spanish super star Fernando Torres from Atletico Madrid, a Spanish club, to the English club Liverpool FC. There were other, bigger clubs competing for his signature, such as Manchester United (Caroe, 2007), but Torres wanted to move to Liverpool:

Reds [Liverpool FC] boss Rafael Benitez said the 23-year-old Spanish striker, who passed a medical on Tuesday, took a pay cut as part of the move. “The Liverpool offer arrived and I told the club to listen to that offer as that is the team I wanted to play for”, said the Spanish international. (BBC, 2007)

So, if the current club is approached by the player’s favourite club, the buying club will gain bargaining power over both current club and the player.

5.3.3.2 What is the buying club’s philosophy?

This factor is also an interaction term. Together with the selling club’s philosophy these two factors decide which club is more inclined to reach their lower limit. For instance, if the owner of the buying club is more willing to win at any cost than the selling club’s owner, the selling club will gain an advantage in the transfer fee negotiation and the player will gain bargaining power in the wage negotiation. The clubs that sold players to Manchester City FC after the club was purchased by the Abu Dhabi United Group, in August 2008 (BBC, 2008d), experienced that. Since the takeover, Manchester City has tried to become one of the top clubs in Europe; and in that quest the owners have had net transfer spending of more than €389m (Transfermarkt, 2011c), truly giving new meaning to the expression “win at any cost”. Real Madrid, in comparison, had a net transfer cost of €281m in the same period (Transfermarkt, 2011d). The owners of Manchester City has a very low ‘Lower limit’ – it is lower than what UEFA will allow in the future (cf. Financial Fair Play) so they will face challenges in the coming years (Wilson, 2011) – and their inclination to reach the lower limit is high.

5.3.4 The bargaining power framework with one buyer

By using the factors explained thus far we will be able to analyse all scenarios where there are one buyer facing one or, in the case of substitute players, multiple sellers. In a scenario with one seller, the transfer fee and the player’s wage will only depend on the player’s and clubs’ characteristics, much like the scenario analysed in Carmichael and Thomas (1993). In the real world, however, a transfer with only three parties – the selling and buying club and the player – is the exception rather than the rule, but it can happen in transfers with super stars: The Ronaldo and Beckham transfers are two examples. With Ronaldo we showed that Carmichael

and Thomas (1993) were right: The characteristics of the three parties determined the bargaining outcome. When there are more sellers, i.e. substitute players exist, however, the bargaining powers can change completely – the buying club is more or less a monopsonist – and we have included that possibility in our framework with the “Substitute players”-factor. Figure 12 shows how a situation with one buyer can be analysed with a matrix. As you can see, we have extended the matrix used for analysing the transfer of Cristiano Ronaldo; the blue, orange and red cells have the same meaning as before. Dark gray cells indicate a situation where no transfer will occur. Arguably, we should have used a wider range of colours to differentiate between important combinations and less important combinations, but we have chosen to use four colours to keep it simple. Increasing the range of colours is not a problem anyway.

We are not going to explain how each combination of bargaining factors affects bargaining power – hopefully the reader will be able to that alone – but we will give some general insight.

The worst combination a buying club can face – except if the player does not like the BC and no transfer can take place – is a scenario where there are no substitute players, the player does not want to move, the selling club does not need to sell for financial reasons, the SC is less inclined to reach the lower limit in a negotiation, and they want to keep the player. This bargaining scenario will give red cells across the board and it translates into the first situation in Figure 9: The BC has to pay a high compensation to the SC in form of a high transfer fee, and the player need high compensation in order to accept a contract offer from the BC. It is evident that the transfer can break down in this scenario if the selling club and player are abusing their bargaining powers.

The opposite scenario, on the other hand, translates into the last situation in Figure 9: When there are many substitute players wanting to move, that are unwanted by their current clubs which also happen to be in financial difficulties, the buying club can act as a monopsonist – all the cells are blue. None of these two, extreme situations are common, however. In general, where there are substitute players and only one buyer, the buying club should find a selling club with a combination of low valuation, i.e. the minimum transfer fee is low, using the ‘Valuation factors’ framework and ‘The valuation model’, and low bargaining power using this framework. But, in order to capture the most common scenarios, i.e. there are substitute players and there are competing bidders, we need to include the last factor group.

Scenario where there are no competing bidders for the player. Transfer fee and salary are determined through negotiation			Player specific factors											Selling and buying club specific factors								
			Substitute players			Current tax for player			Current culture, climate and language			Current wage currency			Needs to sell		SC's tendency to reach lower limit			SC wants to keep player		
			Yes	Some	No	Higher	Same	Lower	Better	Same	Worse	Better	Same	Worse	Yes	No	Higher	Same	Lower	Yes	Indiff.	No
Player specific factors	Player wants to move	Yes, anywhere	SC																			
			P																			
		Not to BC	SC																			
			P																			
		Yes, likes BC	SC																			
		P																				
	Indifferent	SC																				
		P																				
	No	SC																				
		P																				
	Substitute players	Yes			SC																	
					P																	
		Some			SC																	
					P																	
	No			SC																		
					P																	
	Current tax for player	Higher						SC														
								P														
Same							SC															
							P															
Lower						SC																
							P															
Current culture, climate and language	Better								SC													
									P													
	Same								SC													
									P													
Worse									SC													
									P													
Current wage currency	Better												SC									
													P									
	Same												SC									
													P									
Worse													SC									
														P								
Selling and buying club specific factors	Needs to sell	Yes													SC							
															P							
	No														SC							
															P							
	SC's tendency to reach lower limit	Higher																	SC			
																		P				
Same																		SC				
																		P				
Lower																		SC				
																		P				

Figure 12 The bargaining power framework with one buyer

5.3.5 Competing bidder specific factors

These factors come last but they are certainly not the least: By introducing the possibility of competing clubs and their characteristics, and thereby finishing our analytical tool for the determination of bargaining power, we will be able to account for almost every thinkable scenario in the transfer market.

Table 13 show what kinds of market structures we can get in the transfer market.

	One buying club	Several buying clubs
Substitute players	One buyer and several sellers: <i>Monopsony</i>	Many buyers and many sellers: <i>Monopolistic competition</i> Many buyers and some sellers: <i>Oligopoly</i>
No substitute players	One buyer and one seller: <i>Bilateral monopoly</i>	Many buyers and one seller: <i>Monopoly</i>

Table 13 Different kinds of market structures in the transfer market

Do not interpret the market structures too literally, they are only meant as a help in differentiating different scenarios from each other; the transfer fee and salary still depends on other factors as well, and the final framework will take all of this into account.

5.3.5.1 The monopoly – an introduction

You are maybe tempted to say: “where there are several clubs wanting the same player, the transfer will go through with a combination of transfer fee and salary that gives the club with the second highest paying capacity (i.e. second highest capacity of $T+S_{BC}$) a NPV equal to its lower limit.” But you would only be partly right. We start our argumentation with an example:

We have a player targeted by three clubs from the same country. There are no substitute players, i.e., we have a monopoly-like scenario. Let us put up the NPV conditions and work with them:

$$\begin{aligned}
 NPV_A &= (IR_A - \text{known costs}_A) - T - S_A \geq \text{Lower limit}_A \\
 NPV_B &= (IR_B - \text{known costs}_B) - T - S_B \geq \text{Lower limit}_B \\
 NPV_C &= (IR_C - \text{known costs}_C) - T - S_C \geq \text{Lower limit}_C \\
 NPV_{SC} &= T - (DR - \text{known costs}_{SC}) \geq \text{Lower limit}_{SC}
 \end{aligned}$$

Now we make up some numbers:

Club	IR/DR	Known costs	Lower limit	Max T+S / Min T
Club A	€15m	1	-1	15
Club B	12	1	-5	16
Club C	10	1	-1	10
Selling Club	7	3 ($S_{SC}=2$)	0	4

Table 14 Three competing bidders with differing NPV conditions

As we can see, the three competing clubs have different values for the variables in the NPV condition (Table 14). We assume that they have equal known costs and that they will have equal investment horizon or contract length. The player's remaining contract time in the current club is also of that length. Club A is the most winning and popular team in the country/league which is reflected in the high revenue the player is assumed to contribute over the contract period. The owners are willing to suffer a €1m loss on the transfer. Club B is not as popular or successful on the pitch as Club A, but it has recently been acquired by a rich owner willing to spend almost whatever it takes to make the club better. Club C is identical to Club B in popularity and playing success but its owners are less willing to incur losses. The minimum transfer fee, i.e., the transfer fee that satisfies the selling club's NPV condition, is €4m. The player's salary in the selling club is €2m and other costs are €1m.

First we assume that the player is indifferent to where he is playing; so it is reasonable to assume that wage will be his decision variable. The minimum wage the competing clubs can offer over the contract period is then €2m since that is the value of his current contract. A lower offer will be rejected by the player and the transfer will break down. Before we get to the wage negotiation, however, the transfer fee has to be decided. Club A can maximally offer a T that is approaching €13m ($T < 13$). Club C will not be able to match that offer so they are out of the game. Club B, however, can and will match the offer. In fact, Club B can offer €13m and force Club A to give up. Club B is then the winner of the first round and they can proceed to the wage negotiation alone. The player will be happy with a contract offer that is marginally better than his current contract, so the total cost for Club B is just above €15m, giving Club B a NPV = - €4m (€1m above its lower limit). In other words, the prediction we made above was correct: "where there are several clubs wanting the same player, the transfer will go through with a combination of transfer fee and salary that gives the club with the

second highest paying capacity (i.e. second highest capacity of $T+S_{BC}$) a NPV equal to its lower limit.”

5.3.5.2 Wage levels vs. team harmony – new sides of the transfer market

Now, let us introduce some more information about the player and clubs (Table 15), and make the scenario more realistic.

Club	IR/DR	Known costs	Lower limit	Max T+S / Min T	Salary for similar players	Status of player in club
Club A	€15m	1	-1	15	3.5-4.5	Rotation
Club B	12	1	-5	16	4.5-5.5	Rotation
Club C	10	1	-1	10	2.5-3.5	First team
Selling Club	7	3 ($S_{SC}=2$)	0	4	-	Best player

Table 15 Three competing bidders with differing NPV conditions and characteristics

The player is 21 years old with the potential of becoming a better player in the future. He will therefore have a ‘rotation’ status in Club A and B, i.e. he will play some matches but not all, until he improves his skills. For Club C he will already be good enough to play all the matches, hence, we assume that his development will be highest in this club. Further, the salaries for similar players are given by the intervals in Table 15 for Club A, B and C, respectively; so, to avoid envy and disharmony within the team, the clubs will offer a salary in that interval also to new and similar players. Before Cristiano Ronaldo transferred to Real Madrid, one of the Real Madrid players, Wesley Sneijder, expressed his concerns about potential wage differences:

“It’d be bad for the dressing room because he would earn better wages than the rest of the squad,” the Dutch star [Wesley Sneijder] said. “It wouldn’t be a problem to me but some team-mates wouldn’t fancy it. Here we have players like him – Arjen Robben and Robinho for example. For sure I want to play with Cristiano but the dressing room’s harmony has to be maintained.” (The Republik of Mancunia, 2008)

So, avoiding wage differences can be important to maintain harmony within the team. This is actually a side of the transfer market we have not yet considered, and it simplifies our bargaining model: The bargaining over wage will be limited to a team specific interval where the negotiation outcome depends on the parties bargaining power. Thus, we still have to use the bargaining factors framework to determine which party has the bargaining power in the

wage negotiation, so what we have done up until now is not superfluous, but the negotiation outcome will not be *that* uncertain – it is bounded by more narrow lower and upper limits. We can incorporate those limits or wage interval into our NPV condition for the buying club:

$$NPV_{BC} = (IR - \text{known costs}_{BC}) - T - S_{BC} \geq \text{Lower limit}_{BC} \text{ where } S_{BC} \in [\underline{S}, \bar{S}]$$

It is time to supplement Figure 3 with our new knowledge. In Figure 13 we have illustrated the wage interval with two graphs: One with the lower limit wage and one with the upper limit wage.

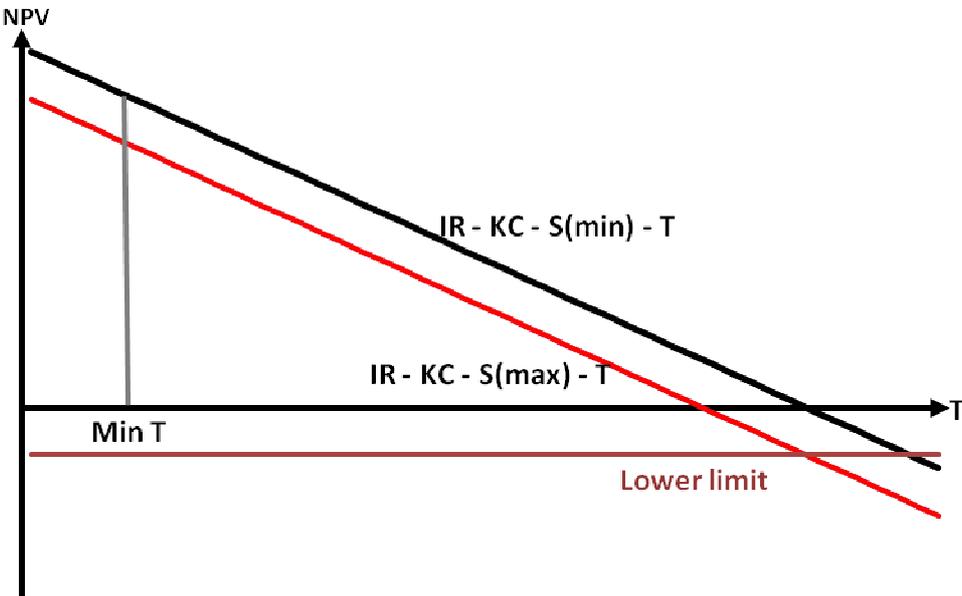


Figure 13 NPV with wage limits

Increased revenue (IR), known costs (KC), transfer fee (T), and lower and upper limit salary are accounted for in the two graphs. The area to the right of the “Min T”-line, below the graphs and above the “Lower limit”-line is then the negotiation area or “the pie” as we called it in Figure 3.

Let us return to our example and see how we can use Figure 13 to analyse the outcome. The player is still indifferent to where he is playing so wage is the decision variable. Again, Club C will be unable to follow the other two clubs’ bidding: The bidding will result in a transfer fee so high that NPV will be below the “Lower limit”-line in Figure 13. Club A knows that it will have to offer €4.5m to match Club B’s contract offer, i.e., Club A’s relevant graph in Figure 13 is the red line. Hence, Club A will only be able to offer a maximum transfer fee of €10.5m (15-4.5=10.5) because that is where the red graph and the “Lower limit”-line will

cross. Club B will, of course, match the transfer fee offer and in the next round they will offer a marginally higher wage than €4.5m, making its total cost €15m. Again our prediction from earlier proved to be correct.

By consulting Figure 9, we see that this scenario translates into a bargaining environment where the selling club has bargaining power over the clubs. For Club A, the player will also have bargaining power because Club A will have to match Club B's wage offer which is on Club A's upper limit: Hence, from Club A's point of view, we are in area 1 in Figure 9. For Club B the situation is different: It has bargaining power over the player because it can offer a salary at the lower limit, so from Club B's points of view we are in area 3 in Figure 9. Consequently, in the real world competing bidders will often have similar purchasing power, like Club A and B. Clubs with relatively low purchasing power, like Club C, will not target players where they will meet competition from clubs with relatively higher purchasing power, because they will not be able to follow in the bidding for transfer fee or wage.

Before we see that market structure is not the only determinant of bargaining power when there are several buyers, we want to make some considerations regarding a potential financial constraint on the transfer fee.

5.3.5.3 Incorporating a financial constraint on the transfer fee

Football clubs, as all other companies, face potential limits on their investment costs due to financial constraints. Our pricing framework should therefore take that in to consideration. If we assume that the financial constraint only applies to the transfer fee and not the wage, the wage interval together with the analysis of bargaining power can help us include a potential financial constraint in the lower limit-variable: The parties know whether or not the player has bargaining power in the wage negotiation; therefore, they can say what the maximum expected salary is going to be *before* either of the negotiations start. If the player has a big advantage in the wage negotiation, the expected maximum salary will have to be set to the upper limit in the wage interval; but, if the player does not have that big of an advantage, the expected maximum salary can be set lower. That is, we can make the wage interval even narrower. Formally, we can rewrite lower limit like this:

$$Lower\ limit_{BC}^* = Max[IR - KC - E(\bar{S}) - FC, Lower\ limit_{BC}]$$

Subtracting known costs (KC), expected maximum salary (E(S)) and financial constraint (FC, i.e. what the club can maximally spend on a transfer fee) from the increased revenue (IR)

gives the worst case scenario for the club; it cannot have a NPV lower than that. Both of the expressions in the max-function will be horizontal lines in Figure 13 but only the one with the highest value – the topmost line – will be binding. So, either the club is restricted through the desired lower limit or it is restricted by the lower limit given by the financial constraint.

We are still going to assume complete information so the selling club will know the financial constraint. Hence, Figure 9 and the bargaining power frameworks can be used the same way as before. If the buying club faces a selling club with high bargaining power (area 1,2 or 3 in Figure 9), however, and the buying club faces a strict financial constraint giving it a high (positive) lower limit, the transfer is more likely to break down.

5.3.5.4 Market structure isn't everything – the return of the bargaining factors

Thus far, it looks like the market structure (monopoly) is the main factor for determining the transfer fee and wage when there are competing buyers. But what if the player in the example only wants to join Club C? We have already explained a scenario like that: The transfer of Fernando Torres to Liverpool (BBC, 2007). When a player has his mind and heart set on joining one particular club, he will not accept any contract offers from other clubs. Therefore, they will not come with competing offers. The implication for our analysis of bargaining power is that a scenario like this can be treated like a scenario with only one buyer; i.e., use Figure 12. But we can think of other scenarios too. In our examples above we assumed that the player was only interested in money, hence Club B would win the bidding. But what if the player prefers to stay at a club that is performing better on the pitch, as opposed to just a high salary? Then Club A would have the advantage and Club B would probably have to pay a premium above the wage offer of Club A in order to sign the player. What happens if we introduce substitute players? And the selling club is in financial problems? It is evident that we have to return to Figure 12 and adapt it to a situation of homogenous competitors.

5.3.6 The bargaining power framework with several buyers

Figure 14 is our bargaining power framework with homogeneously competing bidders, and it aims to account for market structure factors and other bargaining factors. The results obtained from the framework (“putting Xs in the correct cells”) will be individual; e.g. Clubs A and B will get different results. For Club A, the correct answer to the “Player wants to move”-factor is “Yes, prefer other” because the player maximises salary and will therefore, *ceteris paribus*, prefer Club B. As you can see from Figure 14 there are many red cells so the market structure (monopoly) is evident. The selling club has bargaining power in almost all combinations, save

Scenario where there are homogenously competing bidders for the player, i.e., purchasing powers and wage intervals are similar			Player and competing bidder specific factors											Selling club specific factors					
			Substitute players vs. Bidders			Other's tax rates			Other's culture, climate and language			Other's wage currency			Needs to sell		SC wants to keep player		
			More	Same	Fewer	Higher	Same	Lower	Better	Same	Worse	Better	Same	Worse	Yes	No	Yes	Indiff.	No
Player and competing bidder specific factors	Player wants to move	Not to BC	SC																
			P																
		Yes, prefer BC	SC																
			P																
		Yes, prefer other	SC																
		P																	
		Indifferent	SC																
		P																	
		No	SC																
		P																	
	Substitute players vs. Bidders	More			SC														
					P														
		Same			SC														
					P														
		Fewer			SC														
					P														
	Other's tax rate	Higher																	
		Same																	
	Lower																		
	Lower																		
Other's culture, climate and language	Better																		
	Same																		
	Worse																		
Other's wage currency	Better																		
	Same																		
	Worse																		
SC factors	Needs to sell	Yes																	
	No																		

Figure 14 The bargaining power framework with competing bidders

two: When there are more sellers than buyers, i.e., more substitute players than competing bidders, the competing clubs will have bargaining power because they can target different clubs; and when the club does not want the player, the competing clubs gain an advantage if the selling club is offering the player for its minimum transfer fee (cf. “Current player’s club approach other clubs because they want to get rid of a player” in “The transfer from A to Z”).

5.4 Conclusive remarks on the bargaining model

We started our study of the determination of transfer fee and wage by going through the literature on the field. Then we combined the insight from the literature – characteristics of the parties and the market structure determine the negotiation outcomes – with our own considerations and observations into a framework for deciding the two sizes (Figure 9). Next, we proceeded to identify the bargaining factors; that is, which characteristics of the parties – buying club(s), selling club(s) and player(s) – that determine bargaining and market power, and allowed the factors to affect each other (Figures 12 and 14). Further, we showed that wages have to be in a club specific interval to avoid disharmony within the players of the club and we incorporated that, together with a potential financial constraint on the transfer fee, into our NPV condition for the buying club.

By identifying the appropriate scenario – one or several buyers, Figure 12 or 14, respectively – and go through all the factor combinations that determine bargaining power in that scenario, we will be able to find out which party or parties that have bargaining power and we can utilise Figure 9. With some scenarios this exercise will give us the exact transfer fee and wage; with other, more complex scenarios it will give us a fairly narrow interval for the transfer fee and wage. We will now try this exercise with Thierry Henry’s transfer from Arsenal FC to FC Barcelona.

5.4.1 The transfer of Thierry Henry

We start by looking at the known variables in the two clubs’ NPV conditions: IR, DR, known costs, lower limits and wage limits.

Club	IR / DR	Known costs	Lower limit	Min S	Max S
Arsenal	£17m	15.7(£110k p/w)	0	-	-
Barcelona	30	0	-5	14.4 (£85k p/w)	20.7 (£111k p/w)

Table 16 Known variables. Sources: Own calculations; Harris, 2006; The Telegraph, 2008; FC Barcelona Blog: Barca Transfer Zone, 2009

We assume that known costs in Arsenal, which they now save, only consisted of Henry's remaining salary: £110,000 per week (Harris, 2006) or £15.7m capitalised with 4.5% over the next three years. This may be a wrong assumption but other costs will be so small compared to salary and potential errors in the calculation of DR that they will not affect our answers. The same argumentation goes for known costs, i.e., other costs than salary, in Barcelona too, so we set it equal to zero. Lower limit is zero in Arsenal; this is a reasonable assumption given their sustainable business model (Harris, 2011). Concerning Barcelona's lower limit, they faced hard competition on the pitch from Real Madrid that year and were looking to improve their performance. The club had also tried to sign Henry for many years: "Thierry Henry is a player we've been after for many years and now he's here," said Laporta [President of FC Barcelona] (Baskett, 2007). We therefore estimate their lower limit to be £-5m, i.e. the capitalised loss connected with the transfer over the next four years (Henry's contract length in Barcelona) can be £5m, and it is not affected by a financial constraint. Minimum and maximum salaries are the capitalised values of similar players' – Deco and Ronaldinho, respectively – salaries over 4 years in Barcelona.

We can now put up the NPV conditions and find the starting intervals. For Arsenal:

$$NPV_{SC} = T - (DR - known\ costs_{SC}) \geq Lower\ limit_{SC}$$

$$NPV_{SC} = T - 1.3 \geq 0 \Rightarrow T \geq 1.3 \Rightarrow Min\ T = 1.3$$

And Barcelona:

$$NPV_{BC} = (IR - known\ costs_{BC}) - T - S_{BC} \geq Lower\ limit_{BC}\ where\ S_{BC} \in [\underline{S}, \overline{S}]$$

$$NPV_{BC} = 30 - T - S_{BC} \geq -5\ where\ S_{BC} \in [14.4, 20.7]$$

Let us illustrate this with Figure 15:

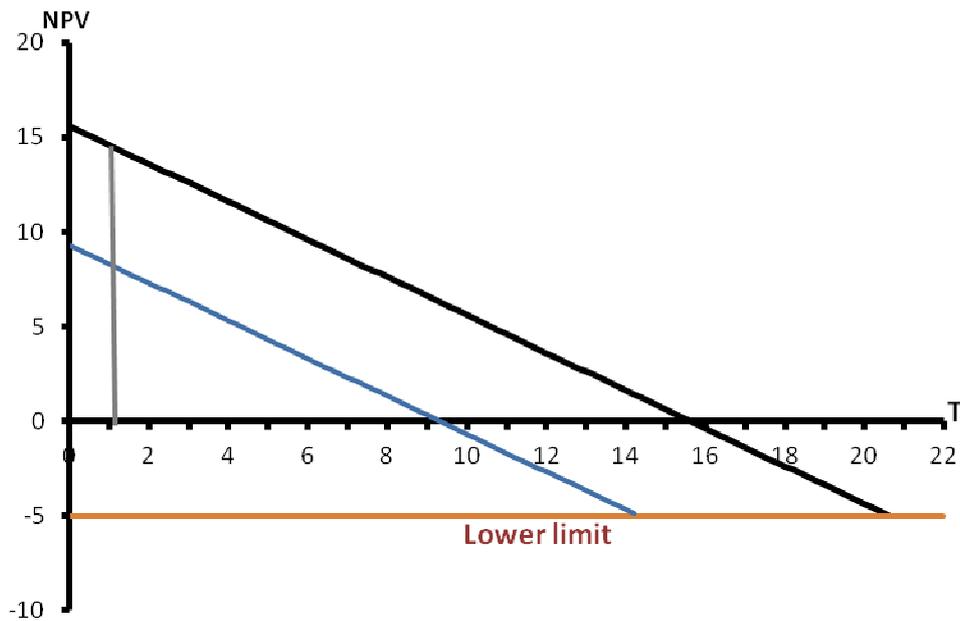


Figure 15 NPV graphs for FC Barcelona

Now we need to use the bargaining model to determine the transfer fee and salary for Henry in Barcelona. There were no competing bidders so we can use Figure 12 to analyse the bargaining powers. Our results from the bargaining power analysis can be seen in Figure 16. We emphasise that these are our subjective opinions – some may be right and some may be wrong. The most influential factors in the analysis of bargaining power are that Henry is a superstar with no substitutes; he is indifferent in the choice between Arsenal and Barcelona, but Arsenal does not want and does not have to sell him. These combinations give Arsenal a big advantage over Barcelona in the transfer fee negotiation and Henry an advantage in the wage negotiation. What speaks in favour of Barcelona is that Spain has better weather, better currency – Henry is French so the euro is probably preferred – and lower income tax for foreigners (Goal, 2009d), but these factors only affect the bargaining power of the player.

All in all, we can therefore conclude this analysis by saying that Arsenal had bargaining power over Barcelona, but neither party had any advantage in the wage negotiation. Hence, we are in area 2 of figure 9: “Buying club will have to pay a high transfer fee to the selling club. In the wage negotiation, neither party has an advantage so buying club should be able to get NPV greater than or equal to lower limit depending on the transfer fee paid to the selling club.” Since neither party have bargaining power in the wage negotiation, Arsenal will assume that Henry will demand a (pre-tax) salary in the middle of the interval – around

FC Barcelona vs. Henry and Arsenal FC			Player specific factors											Selling and buying club specific factors									
			Substitute players			Current tax for player			Current culture, climate and language			Current wage currency			Needs to sell		SC's tendency to reach lower limit			SC wants to keep player			
			Yes	Some	No	Higher	Same	Lower	Better	Same	Worse	Better	Same	Worse	Yes	No	Higher	Same	Lower	Yes	Indiff.	No	
Player specific factors	Player wants to move	Yes, anywhere	SC																				
			P																				
		Not to BC	SC																				
			P																				
		Yes, likes BC	SC																				
		P																					
	Indifferent	SC		X	X					X			X		X	X	X		X				
		P		X	X					X			X		X	X	X		X				
	No	SC																					
		P																					
	Substitute players	Yes			SC																		
					P																		
		Some			SC																		
					P																		
	No			SC	X					X			X		X	X		X		X			
					P	X				X			X		X	X		X		X			
	Current tax for player	Higher						SC			X			X		X		X		X			
								P			X			X		X		X		X			
		Same						SC															
								P															
	Lower						SC																
							P																
Current culture, climate and language	Better								SC														
									P														
	Same								SC														
									P														
Worse									SC			X		X	X			X					
									P			X		X	X			X					
Current wage currency	Better													SC									
														P									
	Same													SC									
														P									
Worse														SC		X	X		X				
														P		X	X		X				
Selling and buying club specific factors	Needs to sell	Yes													SC								
															P								
	No														SC	X			X				
															P	X			X				
	SC's tendency to reach lower limit	Higher																SC		X			
																	P		X				
Same																	SC						
																	P						
Lower																	SC						
																	P						

Figure 16 Analysis of bargaining power for Barcelona in the Henry transfer

£17.6m. Arsenal will therefore demand a transfer fee equal to Barcelona's purchasing power less expected salary for Henry:

$$NPV_{BC} = 30 - T - 17.6 \geq -5 \Rightarrow T = 17.4$$

In the wage negotiation, it is difficult to find an exact answer but we can give a narrower interval because we know the transfer fee and hence the new limit for the maximum wage:

$$S_{BC} \in [14.4, 17.4]$$

Since neither party has a bargaining advantage we guess that they will agree on a wage that is in the middle of this interval, i.e., £15.9m.

If we compare the results of our analysis with those of the real world, we are not that far off. The transfer fee was £17m and the capitalised value of wage (pre-tax) was £16.7m. It looks like our bargaining model managed to explain the transfer fee and wage quite well in this case.

6. Conclusion

In this paper we have made an attempt to construct a complete pricing framework for football players based on theory and real world. In answering the first research topic – What value can a football player add to a football club? – we discovered that different kinds of players will affect revenue in different fashions. To categorize different players, and to describe how they affect revenues, we established two valuation factors: 'increased performance' and 'fan appeal'. In addition to describe how a player affects revenue, the valuation factors also describe a player's performance and how the player can affect the whole team's performance. Based on this, we were able to include the valuation factors in an option pricing framework. The option pricing framework utilizes the evaluated player's performance, and a football club's revenue and performance to calculate a player's financial value. Hence, it fits the two valuation factors. Because no football clubs have exactly similar characteristics, different clubs will get different financial value for the same player – there is no market price for a football player. Thus, to answer the second research topic – How much will the club have to pay for that player? – we had to establish a bargaining framework.

We found that characteristics about the clubs and the player together with the market structure (number of interested clubs vs. number of sellers), are the main determinants for deciding the

transfer fee and the player's wage. We created two frameworks to capture important club and player characteristics (bargaining factors): One where there is one buyer and another where there are competing bidders. By assuming complete information in the transfer market, the participants in the transfer can analyse which party has bargaining and/or market power and, consequently, what the transfer fee and wage should be.

References

Adler, Moshe (2006): "Stardom and Talent". *Handbook of the Economics of Art and Culture, Volume 1*, ch. 25.

Amir, Eli & Livne, Gilad (2005): "Accounting, Valuation and Duration of Football Player Contracts". *Journal of Business Finance & Accounting*, 32(3) & (4),

Andreff, Wladimir & Szymanski, Stefan (2006): *Handbook on the Economics of Sport*. Edward Elgar Publishing Limited

Antonioni, Peter & Cubbin, John (2000): "The Bosman Ruling and the emergence of a single market in soccer talent". *European Journal of Law and Economics*, Vol. 9 (2), pp. 157-73

Atkinson, Scott E., Stanley, Linda R. & Tschirhart, John (1988): "Revenue Sharing as an Incentive in an Agency Problem: An Example from the National Football League". *Rand Journal of Economics*, Vol. 19, No. 1, pp. 27-43

Baimbridge, Mark, Cameron, Samuel & Dawson, Peter (1995): "Satellite broadcasting and match attendance: the case of rugby league". *Applied Economics Letters*, 2, pp. 343-346

Barajas, Angel, Fernández-Jardón, Carlos & Crolley, Liz (2005): "Does sports performance influence revenues and economic results in Spanish football?" *MPRA Paper* No. 3234

Baskett, Simon (25.06.2007): "Henry completes move to Barca", *Reuters* [internet] Accessible from: <<http://uk.reuters.com/article/2007/06/25/uk-soccer-spain-idUKL253361120070625>> [Downloaded 01.06.2011]

Baz, Jamil & Chacko, George (2004): *Financial Derivatives*. Cambridge: Cambridge University Press

BBC (04.07.2007): *Liverpool complete Torres signing* [internet] Accessible from: <<http://news.bbc.co.uk/sport2/hi/football/europe/6239286.stm>> [Downloaded 28.05.2011]

BBC (06.06.2008a): *Ronaldo 'wants to play at Madrid'* [internet] Accessible from: <http://news.bbc.co.uk/sport2/hi/football/teams/m/man_utd/7439031.stm> [Downloaded 23.05.2011]

BBC (10.06.2008b): *Real deny Man Utd Ronaldo claims* [internet] Accessible from: <http://news.bbc.co.uk/sport2/hi/football/teams/m/man_utd/7416981.stm> [Downloaded 23.05.2011]

BBC (10.07.2008c): *Ronaldo 'wants transfer freedom'* [internet] Accessible from: <http://news.bbc.co.uk/sport2/hi/football/teams/m/man_utd/7499028.stm> [Downloaded 23.05.2011]

BBC (01.09.2008d): *Arab group agrees Man City deal* [internet] Accessible from <http://news.bbc.co.uk/sport2/hi/football/teams/m/man_city/7591735.stm> [Downloaded 28.05.2011]

BBC (11.06.2009a): *History of the world transfer record* [internet] Accessible from: <<http://news.bbc.co.uk/sport2/hi/football/8085391.stm>> [Downloaded 28.05.2011]

BBC (17.07.2009b): *Tax rise 'to hike footballers pay'* [internet] Accessible from <<http://news.bbc.co.uk/2/hi/business/8155677.stm>> [Downloaded 26.05.2011]

BBC (04.02.2010): *Court lifts Chelsea transfer ban over Kakuta signing* [internet] Accessible from: <<http://news.bbc.co.uk/sport2/hi/football/teams/c/chelsea/8499169.stm>> [Downloaded 06.05.2011]

BBC (31.03.2011): *Liverpool sponsor wants club to buy Asian stars* [internet] Accessible from: <<http://news.bbc.co.uk/sport2/hi/football/teams/l/liverpool/9442542.stm>> [Downloaded 31.03.2011]

Borland, Jeffery & MacDonald, Robert (2003): "Demand for Sport". *Oxford Review of Economic Policy*, Vol. 19, no. 4

Brandes, Leif, Franck, Egon & Nüesch, Stephan (2007): "Local Heroes and Superstars: An Empirical Analysis of Star Attraction in German Soccer". *Journal of Sports Economics* 2008; 9; 266

Broder, Christina (08.10.2010): "Deloitte UK Finds 2010 Premier League Clubs Transfer Spending Is 22% Below 2009" [internet], Big4, Accessible from <<http://www.big4.com/news/deloitte-uk-finds-2010-premier-league-clubs-transfer-spending-is-22-below-2009-1608>> [Downloaded 26.05.2011]

Carmichael, Fiona & Thomas, Dennis (1993): "Bargaining in the transfer market: theory and evidence". *Applied Economics*, Vol. 25, pp. 1467-76

Carmichael, Fiona, Forrest, David & Simmons, Robert (1999): "The labour market in association football: Who gets transferred and for how much?". *Bulletin of Economic Research*, Vol. 51 no. 2, pp. 125-149

Caroe, Chalie and agencies (2007): "I wanted Torres for Man Utd", *The Telegraph*, 14.12.2007 [internet] Accessible from <<http://www.telegraph.co.uk/sport/football/2328504/Ferguson-I-wanted-Torres-for-Man-Utd.html>> [Downloaded 28.05.2011]

Cathcart, Brian (2004): “Special investigation: Crisis at Leeds United”, *The Observer*, 07.03.2004 [internet] Accessible from:
<<http://www.guardian.co.uk/football/2004/mar/07/sport.features1>> [Downloaded 17.05.2011]

Conn, David (21.03.2007): “Hammers face a pounding over third-party player agreements”, *The Guardian* [internet] Accessible from:
<<http://www.guardian.co.uk/football/2007/mar/21/newsstory.sport>> [Downloaded 18.05.2011]

Court of Justice of the European Communities (CJEC) (1995): “Judgment of 15 December 1995, Union Royale Belge des Sociétés de Football Association ASBL and Others v Jean-Marc Bosman and Others”. *Reports of Cases before the Court*, Case C-415/93, p. 4921

Deloitte (02.2008): *Football Money League: Gate receipts* [internet] Accessible from
<http://www.deloitte.com/assets/Dcom-UnitedKingdom/Local%20Assets/Documents/UK_SBG_FML08.pdf> [Downloaded 10.01.2011]

Deloitte (02.2009): *Football Money League: Lost in translation* [internet] Accessible from
<http://www.deloitte.com/view/en_GB/uk/industries/sportsbusinessgroup/a02ee3dad5181210VgnVCM100000ba42f00aRCRD.htm> [Downloaded 10.01.2011]

Deloitte (03.2010): *Football Money League: Spanish Masters* [internet] Accessible from
<http://www.deloitte.com/assets/Dcom-UnitedKingdom/Local%20Assets/Documents/Industries/Sports%20Business%20Group/UK_SBG_DFML2010.pdf> [Downloaded 10.01.2011]

Deloitte (02.2011): *Football Money League: The Untouchables* [internet] Accessible from
<http://www.deloitte.com/assets/Dcom-UnitedKingdom/Local%20Assets/Documents/Industries/Sports%20Business%20Group/UK_SBG_DFML2011.pdf> [Downloaded 27.05.2011]

Directgov (22.06.2010): “Income Tax and National Insurance rates for 2010-11” [internet] Accessible from:
<http://www.direct.gov.uk/en/N11/Newsroom/PreBudgetReport2009/DG_183037> [Downloaded 07.04.2011]

Dixit, Avinash K. & Pindyck, Robert S. (1994): *Investment under uncertainty*. Princeton, NJ: Princeton University Press

Dobson, Stephen & Gerrard, Bill (1999): “The Determination of Player Transfer Fees in English Professional Soccer”. *Journal of Sport Management*, Vol. 13, pp 259-79

Dobson, Stephen & Gerrard, Bill (2000): "Testing for monopoly rents in the market for playing talent. Evidence from English professional football" *Journal of Economic Studies*, Vol. 27 No. 3, pp 142-64

Drut, Bastien & Raballand, G el (2010): "The Impact of Governance on European Football Leagues' Competitiveness". *EconomiX*, Working Paper 2010-27

ESPN (21.08.2010): *AC Milan announce Ibrahimovic deal* [internet] Accessible from: <<http://soccernet.espn.go.com/news/story?id=818790&sec=transfers&cc=5739>> [Downloaded 16.05.2011]

Eurorivals (2011): *Football Players Abroad* [internet] Accessible from: <<http://eurorivals.net/abroad.html>> [Downloaded 26.05.2011]

Eurosport (22.03.2011): *La Liga - Messi, Mourinho football's top earners* [internet] Accessible from: <<http://uk.eurosport.yahoo.com/22032011/58/la-liga-messi-mourinho-football-top-earners.html>> [Downloaded 24.05.2011]

FC Barcelona Blog: *Barca Transfer Zone* (29.04.2009): *Deco plays it hard* [internet] Accessible from: <<http://fcbrtransfers.blogspot.com/2009/04/2008-deco-plays-it-hard.html>> [Downloaded 01.06.2011]

Feess, Eberhard and Gerd Muehlheusser (2003): "The Impact of Transfer Fees on Professional Sports: An Analysis of the New Transfer System for European Football" *Scandinavian Journal of Economics*, Vol. 105, no. 1, pp 139-154

FIFA (2010): *FIFA Regulations on the Status and Transfer of Players* [internet] Accessible from: <http://www.fifa.com/mm/document/affederation/administration/01/27/64/30/regulationsstatusandtransfer2010_e.pdf>

Fletcher, Paul (2005): "The truth about 'tapping up'" *BBC*, 01.06.2005 [internet] Accessible from: <<http://news.bbc.co.uk/sport2/hi/football/4599103.stm>> [Downloaded 13.05.11]

Fort, Rodney (2005): "The Golden Anniversary of 'the Baseball Players' Labor Market'" *Journal of Sports Economics*, Vol. 6, no. 4, pp 347-358

Frick, Bernd (2007): "The football players' labor market: empirical evidence from the major European leagues" *Scottish Journal of Political Economy*, Vol 54, no. 3, pp 422-446

Garcia-del-Barro, Pedro & Pujol, Francesc (2007): "Hidden Monopsony Rents in Winner-take-all Markets – Sport and Economic Contribution of Spanish Soccer Players" *Managerial and Decision Economics*, Vol. 28, pp 57-70

Garcia-del-Barro, Pedro & Szymanski, S. (2009): “Goal! Profit maximization versus win maximization in soccer” *Review of Industrial Organization*, Vol. 34, no. 1, pp 45-68

Gibson, Owen (2009): “Chelsea banned by FIFA from signing players till 2011 over Gaël Kakuta” *The Guardian*, 03.09.2009 [internet] Accessible from: <<http://www.guardian.co.uk/football/2009/sep/03/chelsea-fifa-transfer-ban-gael-kakuta>> [Downloaded 06.05.11]

Goal (11.06.2009a): *Real Madrid's Cristiano Ronaldo Bid Tops World Record Chart* [internet] Accessible from: <<http://www.goal.com/en/news/8/main/2009/06/11/1318584/real-madrids-cristiano-ronaldo-bid-tops-world-record-chart>> [Downloaded 17.05.2011]

Goal (11.06.2009b): *Michel Platini Slams Real Madrid's 'Excessive' Pursuit Of Cristiano Ronaldo* [internet] Accessible from: <<http://www.goal.com/en/news/9/england/2009/06/11/1319165/michel-platini-slams-real-madrids-excessive-pursuit-of-cristiano>> [Downloaded 17.05.2011]

Goal (11.06.2009c): *No Player Is Worth €95 Million - Barcelona Vice-President* [internet] Accessible from: <<http://www.goal.com/en/news/12/spain/2009/06/11/1319395/no-player-is-worth-95-million-barcelona-vice-president>> [Downloaded 17.05.2011]

Goal (23.12.2009d): *Beckham Law Expiration Acquits Foreign Signings Of Tax Break* [internet] Accessible from: <<http://www.goal.com/en/news/12/spain/2009/12/23/1705794/beckham-law-expiration-acquits-foreign-signings-of-tax-break>> [Downloaded 01.06.2011]

The Guardian (21.01.2011): *Ian Holloway calls Aston Villa's bids for Charlie Adam 'disgraceful'* [internet] Accessible from: <<http://www.guardian.co.uk/football/2011/jan/21/ian-holloway-aston-villa-charlie-adam>> [Downloaded 21.01.2011]

Hamil, Sean (2010): “Barcelona show Manchester United how fan power can reap benefits”, *London Evening Standard*, 09.04.2010 [internet] Accessible from <<http://www.thisislondon.co.uk/markets/article-23822574-barcelona-show-manchester-united-how-fan-power-can-reap-benefits.do>> [Downloaded 27.05.2011]

Harris, Chris (04.02.2011): “Wenger - Financial fair-play rules uncertain”, *Arsenal.com* [internet] Accessible from: <<http://www.arsenal.com/news/news-archive/wenger-financial-fair-play-rules-uncertain>> [Downloaded 01.06.2011]

Harris, Nick (20.05.2006): “Ballack and Henry cash in as wages hit new high”, *The Independent* [internet] Accessible from: <<http://www.independent.co.uk/sport/football/news-and-comment/ballack-and-henry-cash-in-as-wages-hit-new-high-478925.html>> [Downloaded 29.05.2011]

Hausman, Jerry A., & Leonard, Gregory K. (1997): "Superstars in the National Basketball Association: Economic Value and Policy". *Journal of Labor Economics*, Vol. 15, No. 4, pp. 586-624

Hull, John C. (2009): *Options, Futures, and other Derivatives (7th edition)*. Upper Saddle River: Prentice Hall

Kahn, Lawrence M. (2000): "The Sports Business as a Labor Market Laboratory" *Journal of Economic Perspectives*, Vol. 14, no. 3, Summer 2000, pp 75-94

Kelso, Paul (02.02.2011): "Manchester United owners, the Glazer family, move ownership of the club to a company in Delaware", *The Telegraph* [internet] Accessible from <<http://www.telegraph.co.uk/sport/football/teams/manchester-united/8299603/Manchester-United-owners-the-Glazer-family-move-ownership-of-the-club-to-a-company-in-Delaware.html>> [Downloaded 27.05.2011]

Kleven, Henrik, Landais, Camille & Saez, Emmanuel (2010): "Taxation and international migration of superstars: Evidence from the European football market" *NBER working paper series*, Working Paper 16545

Kesenne, Stefan (2007): "The peculiar international economics of professional football in Europe" *Scottish Journal of Political Economy*, Vol. 54, no. 3, pp 388-399

Manzenreiter, Wolfram (2007): "The Business of Sports and the Manufacturing of Global Social Inequality". *Business of sports*, Vol. 2, no. 6

Mason, Daniel S. (1999): "What is the sports product and who buys it? The marketing of professional sports leagues". *European Journal of Marketing*, Vol. 33 No. 3/4, pp. 402-418.

McDonald, Mark A., Milne, George R., & Hong, JinBae (2002): "Motivational Factors for Evaluating Sport Spectator and Participant Markets". *Sport Marketing Quarterly*, Vol. 11, no. 2

Mercopress (31.12.2009): *Ronaldo the most profitable player in Real Madrid's history* [internet] Accessible from: <<http://en.mercopress.com/2009/12/30/ronaldo-the-most-profitable-player-in-real-madrids-history>> [Downloaded 17.05.2011]

PRLog (12.05.2010): *Real Madrid has recovered Cristiano Ronaldo transfer fee* [internet] Accessible from: <<http://www.prlog.org/10675785-real-madrid-has-recovered-cristiano-ronaldo-transfer-fee.html>> [Downloaded 17.05.2011]

Mullin, Charles J. & Dunn, Lucia F. (2002): "Using baseball card prices to measure star quality and monopsony". *Economic Inquiry*, Vol. 40, no. 4, pp. 620-632

- Nash, John (1950): "The bargaining problem". *Econometrica*, Vol. 18, pp. 155-62
- Nash, John (1953): "The two-person cooperative games". *Econometrica*, Vol. 21, pp. 128-40
- Neftci, Salih N. (1996): *An Introduction to the Mathematics of Financial Derivatives*. Academic Press
- Ogden, Mark (11.06.2009): "Cristiano Ronaldo transfer: Real Madrid agree £80 million fee with Manchester United" *The Telegraph* [internet] Accessible from: <<http://www.telegraph.co.uk/sport/football/teams/manchester-united/5505073/Cristiano-Ronaldo-transfer-Real-Madrid-agree-80-million-fee-with-Manchester-United.html>> [Downloaded 17.05.2011]
- Osselaer, Jerome (06.11.2008): "How the Malaja Case Case Changed the Football World" *Football Partnerships* [internet] Accessible from: <<http://www.footballpartnerships.com/2008/11/how-the-malaja-case-changed-the-football-world/>> [Downloaded 12.04.11]
- Palmer, Bryn (18.06.2003): "The end of the affair", *BBC* [internet] Accessible from: <http://news.bbc.co.uk/sport2/hi/football/teams/m/man_utd/2980708.stm> [Downloaded 28.05.2011]
- Porter, Philip K. (1992): "The Role of the Fan in Professional Baseball" in Paul M. Sommers (ed.) *Diamonds are Forever: The Business of Baseball*, pp.63-75. Washington D.C.:The Brookings Institution
- Premier League (2011): *A History of The Premier League*. [internet] Accessible from: <<http://www.premierleague.com/page/History>> [Downloaded 07.04.2011]
- Rosen, Sherwin (1981): "The Economics of Superstars". *The American Economic Review*, Vol. 71, No. 5, pp. 845-858
- Rottenberg, Simon (1956): "The baseball players' labor market". *Journal of Political Economy*, Vol. 64, no. 3, pp 242-58
- Rubinstein, Ariel (1982): "Perfect equilibrium in a bargaining model". *Econometrica*, Vol. 50, no. 1
- Sangera, Mandeep (30.01.2007): "The anatomy of a transfer deal" *BBC* [internet] Accessible from: <<http://news.bbc.co.uk/sport2/hi/football/6314369.stm>> [Downloaded 11.05.2011]
- Scully, Gerald W. (2004): "Player Salary Share and the Distribution of Player Earnings". *Managerial and Decision Economics*, Vol. 25, No. 2, Sports Economics, pp.77-86

Simmons, Robert & Robinson, Terry (2009): "Gate Sharing and Talent Distribution in the English Football League". Manchester Business School Working Paper No 570

Sloane, Peter J. (1961): "The labour market in professional football" *British Journal of Industrial Relations*, Vol. 7, no. 2, pp. 181-99

Speight, Alan & Thomas, Dennis (1997): "Arbitrator decision-making in the transfer market: an empirical analysis". *Scottish Journal of Political Economy*, Vol. 44 No. 2, pp. 198-215

Szymanski, Stefan (1998): "Why is Manchester United So Successful?". *Business Strategy Review*, Volume 9 Issue 4, pp 47-54

Szymanski, Stefan and Ron Smith (1997): "The English football industry: Profit, performance and industrial structure". *International Review of Applied Economics*, Vol. 11, pp. 135-53

The Republik of Mancunia (16.07.2008): *Ronaldo Bad News For Real's Dressing Room Morale* [internet] Accessible from <<http://therepublikofmancunia.com/ronaldo-bad-news-for-reals-dressing-room-morale/>> [Downloaded 31.05.2011]

The Telegraph (12.01.2010): *Manchester United's debt: six key questions* [internet] Accessible from <<http://www.telegraph.co.uk/sport/football/teams/manchester-united/6969460/Manchester-Uniteds-debt-six-key-questions.html>> [Downloaded 26.05.2011]

Transfermarkt (2011a): *Robbie Fowler - Player changes, player transfers* [internet] Accessible from <http://www.transfermarkt.de/en/robbie-fowler/transfers/spieler_3225.html> [Downloaded 26.05.2011]

Transfermarkt (2011b): *Robbie Keane - Player changes, player transfers* [internet] Accessible from <http://www.transfermarkt.de/en/robbie-keane/transfers/spieler_3144.html> [Downloaded 26.05.2011]

Transfermarkt (2011c): *Manchester City - Player changes, player transfers* [internet] Accessible from <http://www.transfermarkt.de/en/manchester-city/transfers/verein_281.html> [Downloaded 28.05.2011]

Transfermarkt (2011d): *Real Madrid - Player changes, player transfers* [internet] Accessible from <http://www.transfermarkt.de/en/real-madrid/transfers/verein_418.html> [Downloaded 31.05.2011]

Tunaru, Radu, Clark, Ephraim & Viney, Howard (2005): "An option pricing framework for valuation of football players". *Review of Financial Economics*, Vol. 14, pp. 281-295

Tunaru, Radu & Viney, Howard (2010): "Valuations of Soccer Players from Statistical Performance Data". *Journal of Quantitative Analysis in Sports*, Vol. 6, issue 2, Article 10

UEFA (2010a): “*UEFA Club Licensing and Financial Fair Play Regulations, Edition 2010*”

UEFA (2010b): “*The European Club Footballing Landscape*”

Vrooman, John (2007a): “Economics of Sport. Editor’s Introduction” *Scottish Journal of Political Economy*, Vol. 54, no. 3, pp 309-313

Vrooman, John (2007b): “Theory of the beautiful game: The unification of European football”. *Scottish Journal of Political Economy*, Vol. 54, no. 3, pp 314-354

Watts, Robert & Harris, Nick (31.05.2009): “Football stars plan to dodge 50p tax rate” *The Times* [internet] Accessible from:
<<http://www.timesonline.co.uk/tol/sport/article6395778.ece>> [Downloaded 07.04.11]

White, Duncan (20.06.2009): “Xabi Alonso warns that tax will drive top players away”. *The Telegraph* [internet] Accessible from:
<<http://www.telegraph.co.uk/sport/football/teams/liverpool/5578084/Xabi-Alonso-warns-that-tax-will-drive-top-players-away.html>> [Downloaded 07.04.11]

Wilson, Jeremy (02.02.2011): “Chelsea and Manchester City confident they will meet Uefa financial fair-play rules” *The Telegraph* [internet] Accessible from:
<<http://www.telegraph.co.uk/sport/football/competitions/premier-league/8297380/Chelsea-and-Manchester-City-confident-they-will-meet-Uefa-financial-fair-play-rules.html>>
[Downloaded 29.05.2011]

Appendix

Multivariate Ito's Lemma

To find the differential dX , where

$$X = \frac{T}{S}$$

and

$$dT = \alpha T dt + \sigma T dz$$

$$dS = \gamma S dt + \delta S dw$$

$$E(dzdw) = \rho dt$$

we must apply the formula for a multivariate Ito's Lemma. The general expression for a multivariate Ito's Lemma with two (T and S) Ito processes is (see e.g. Dixit and Pindyck, 1994; Neftci, 1996; Hull 2009):

Suppose you have two differentials:

$$dx_i = a_i dt + b_i dz_i \text{ where } i = 1, 2 \text{ and } \quad (1)$$

$$E(dz_1 dz_2) = \rho dt.$$

Suppose $F = F(x_1, x_2, t)$ is a function of time and the two Ito processes x_1 and x_2 . Then Ito's Lemma gives the differential dF as

$$dF = \frac{\partial F}{\partial t} dt + \sum_i \frac{\partial F}{\partial x_i} dx_i + \frac{1}{2} \sum_i \sum_j \frac{\partial^2 F}{\partial x_i \partial x_j} dx_i dx_j \quad (2)$$

We can substitute (1) for dx_i and write (2) in expanded form:

$$dF = \left[\frac{\partial F}{\partial t} + \sum_i a_i \frac{\partial F}{\partial x_i} + \frac{1}{2} \sum_i b_i^2 \frac{\partial^2 F}{\partial x_i^2} + \frac{1}{2} \sum_{i \neq j} \rho_{ij} b_i b_j \frac{\partial^2 F}{\partial x_i \partial x_j} \right] dt + \sum_i b_i \frac{\partial F}{\partial x_i} dz_i \quad (3)$$

We can do the following substitutions to apply this formula to our case:

$$F = X = \frac{T}{S}$$

$$x_1 = T \text{ and } x_2 = S$$

$$a_1 = \alpha T, a_2 = \gamma S, b_1 = \sigma T, b_2 = \delta S.$$

$$\frac{\partial X}{\partial t} = 0, \quad \frac{\partial X}{\partial T} = \frac{1}{S}, \quad \frac{\partial X}{\partial S} = -\frac{T}{S^2}, \quad \frac{\partial^2 X}{\partial T^2} = 0, \quad \frac{\partial^2 X}{\partial S^2} = \frac{2T}{S^3},$$

$$\frac{\partial^2 X}{\partial T \partial S} = -\frac{1}{S^2}, \quad \frac{\partial^2 X}{\partial S \partial T} = -\frac{1}{S^2}$$

Inserted into (3):

$$dX = \left[0 + \left(\alpha T \cdot \frac{1}{S} + \gamma S \cdot \left(-\frac{T}{S^2} \right) \right) + \frac{1}{2} \left(\sigma^2 T^2 \cdot 0 + \delta^2 S^2 \cdot \frac{2T}{S^3} \right) + \frac{1}{2} \left(\rho \sigma T \delta S \cdot \left(-\frac{1}{S^2} \right) + \rho \sigma T \delta S \cdot \left(-\frac{1}{S^2} \right) \right) \right] dt + \sigma T \cdot \frac{1}{S} dz + \delta S \cdot \left(-\frac{T}{S^2} \right) dw.$$

By using the fact $\frac{T}{S} = X$, we get:

$$dX = [(\alpha + \delta^2 - \gamma - \rho\delta\sigma)X]dt + \sigma X dz - \delta X dw.$$

The differential dY, where $Y = NX$. Here, N and X are uncorrelated and

$$dN = aNdt + bNdH$$

$$dX = AXdt + X\sqrt{\sigma^2 + \delta^2 - 2\sigma\delta\rho} d\Omega$$

$$\text{where } A = \alpha + \delta^2 - \gamma - \rho\delta\sigma$$

Using (3) without the terms including the correlation (=0) and substituting

$$F = Y = NX$$

$$x_1 = N \text{ and } x_2 = X$$

$$a_1 = aN, a_2 = AX, b_1 = bN, b_2 = X\sqrt{\sigma^2 + \delta^2 - 2\sigma\delta\rho}$$

$$\frac{\partial Y}{\partial t} = 0, \frac{\partial Y}{\partial N} = X, \frac{\partial Y}{\partial X} = N, \frac{\partial^2 Y}{\partial N^2} = 0, \frac{\partial^2 Y}{\partial X^2} = 0, \frac{\partial^2 Y}{\partial N \partial X} = 1, \frac{\partial^2 Y}{\partial X \partial N} = 1$$

we now get

$$dY = \left[0 + (aN \cdot X + AX \cdot N) + \frac{1}{2}(b^2N^2 \cdot 0 + X^2(\sigma^2 + \delta^2 - 2\sigma\delta\rho) \cdot 0) \right] dt + bN \cdot XdH + X\sqrt{\sigma^2 + \delta^2 - 2\sigma\delta\rho} \cdot Nd\Omega. \quad (4)$$

Since $NX = Y$ the expression can be written as

$$dY = (a + A)Ydt + bYdH + \sqrt{\sigma^2 + \delta^2 - 2\sigma\delta\rho} Yd\Omega.$$

If N and X are correlated:

$$E(dHd\Omega) = \psi dt$$

the terms in (3) including the correlation must be added in (4):

$$dY = \left[0 + (aN \cdot X + AX \cdot N) + \frac{1}{2}(b^2N^2 \cdot 0 + X^2(\sigma^2 + \delta^2 - 2\sigma\delta\rho) \cdot 0) + \frac{1}{2}(\psi bNX\sqrt{\sigma^2 + \delta^2 - 2\sigma\delta\rho} \cdot 1 + \psi X\sqrt{\sigma^2 + \delta^2 - 2\sigma\delta\rho} bN \cdot 1) \right] dt + bN \cdot XdH + X\sqrt{\sigma^2 + \delta^2 - 2\sigma\delta\rho} \cdot Nd\Omega$$

Applying $NX = Y$ gives the following expression:

$$dY = (a + A + \psi b\sqrt{\sigma^2 + \delta^2 - 2\sigma\delta\rho})Ydt + bYdH + \sqrt{\sigma^2 + \delta^2 - 2\sigma\delta\rho} Yd\Omega.$$